BANK OF CANADA
BANQUE DU CANADA

Bank of Canada Review

Winter 2011–2012

Special Issue:
Household Finances and Financial Stability

Contents

Introduction	1
What Explains Trends in Household Debt in Canada?	3
Household Borrowing and Spending in Canada	16
Medium-Term Fluctuations in Canadian House Prices	30
Household Insolvency in Canada	43

Members of the Editorial Board

Chair: Lawrence Schembri

Jean Boivin	Allan Crawford	Timothy Hodgson	Timothy Lane	John Murray	Carolyn Wilkins
Don Coletti	Gerry Gaetz	Donna Howard	Tiff Macklem	Sheila Niven	David Wolf
Agathe Côté	Prasanna Gai	Sharon Kozicki	Ron Morrow	Ianthi Vayid	

Editor: Alison Arnot

The *Bank of Canada Review* is published four times a year under the direction of an Editorial Board, which is responsible for the editorial content. The contents of the *Review* may be reproduced or quoted, provided that the *Bank of Canada Review*, with its date, is specifically cited as the source.

For further information, contact:

Public Information
Communications Department
Bank of Canada
Ottawa, Ontario, Canada K1A 0G9

Telephone: **613 782-8111**; **1 800 303-1282** (toll free in North America)
Email: **info@bankofcanada.ca**
Website: **bankofcanada.ca**

ISSN 1483-8303
© Bank of Canada 2012

Introduction

Graydon Paulin, Guest Editor

The global financial turmoil that has persisted since 2007 has encouraged research into the factors that add to, or detract from, financial stability. Households are a central component of Canada's economy and, hence, its financial stability. Although Canada has weathered the global turmoil relatively well, the robustness of domestic household finances remains an important determinant of the country's economic and financial well-being. This financial health is heavily influenced by two key factors: a household's level of indebtedness relative to its ability to meet its financial obligations, and changes in the valuation of the single most important asset held by many Canadians—their homes.

The articles in this special issue of the *Review* all reflect two important facts. First, in recent decades, there has been a steady increase in Canadian household indebtedness, as measured by the ratio of household debt to personal disposable income. Second, real house prices in Canada have exhibited an upward trend since 2000. These facts are interrelated, since rising house prices can facilitate the accumulation of debt. Households could therefore experience a significant shock if house prices were to reverse.

The trend increase in household indebtedness is not unique to Canada, since a similar rise can be observed across other advanced economies. As well, the Canadian housing market has not exhibited the excesses seen in other countries where severe economic disruptions have occurred in recent years. Higher levels of indebtedness will nevertheless make households more vulnerable to adverse shocks, whether they emerge from the housing market or elsewhere. Research that investigates the elements contributing to indebtedness and how debt is used will help us to understand the evolution of household finances and whether these elements are likely to contribute to shocks that affect the stability of the Canadian financial system.

A variety of factors underpin the rise in household indebtedness in advanced countries. In the article "What Explains Trends in Household Debt in Canada?" Allan Crawford and Umar Faruqui explore the factors behind the increase observed in this country since the late 1990s. They note that, as the population ages, households tend to increase their savings, moderating any growth in overall debt. Since Canada's aging population would have dampened the rise in aggregate household debt, other factors must have offset this effect in order for the strong upward trend to continue.

Given that mortgages constitute much of the rise in debt, factors affecting housing affordability, including household income, likely played a central role in the overall increase. A significant proportion of the increase in household debt has also been in consumer credit rather than mortgages, facilitated by the rising valuations of housing (used as collateral for loans) and financial innovation that makes it easier for households to access this credit.

In addition to the level of debt, the way it is employed may also affect outcomes during periods of economic stress. If debt has been used to finance household consumption, for example, consumption may be constrained following a shift toward reducing debt burdens. In "Household Borrowing and Spending in Canada," Jeannine Bailliu, Katsiaryna Kartashova and Césaire Meh focus on how the accumulation of debt is related to household expenditures, specifically consumption and spending on home renovation. They observe that the share of consumption financed by home-equity extraction has risen since 2000. They also note that a much larger share of spending on home renovation is financed by these debt flows. Home-equity extraction in turn has been supported by rising house prices and financial innovation. Simulation results suggest that a negative shock to house prices could have a relatively large impact on consumption.

As these two articles note, rising house prices can facilitate the accumulation of debt so that a drop in prices can represent a significant shock for households. In "Medium-Term Fluctuations in Canadian House Prices," Brian Peterson and Yi Zheng describe research that uses different analytical approaches to explain movements in house prices. While growth in both population and income dominates the supply of and demand for housing in the longer run, a variety of additional factors can influence prices in the shorter term. The authors review the effect on house prices of such variables as the real effective mortgage interest rate, expectations of future growth in house prices and market liquidity (represented by turnover in the housing market), in the context of models that can provide insights on escalating price movements.

Financial stress in households may lead to increased incidences of insolvency. Jason Allen and Evren Damar, in "Household Insolvency in Canada," examine the characteristics of insolvent households and present research on the types of information that creditors collect when they lend to individuals. Although insolvency, which includes both bankruptcy and debt restructuring, affects a relatively small number of Canadians, the insolvency rate has risen in recent years, partly in response to changes in the rules governing those who are eligible to file a proposal for debt restructuring. As well, the likelihood of bankruptcy may be affected by decisions that creditors make during the lending process. Over time, creditors have tended to rely more heavily on "hard information" (e.g., credit-scoring results) when making lending decisions, and less on "soft information" acquired through direct contact with clients in bank branches. The authors present econometric evidence indicating that more intensive use of soft information can help to reduce the default rates on loans.

What Explains Trends in Household Debt in Canada?

Allan Crawford, Adviser, and Umar Faruqui, Financial Stability Department

- The aggregate debt-to-income ratio of Canadian households has trended upward over the past 30 years. Both mortgage and non-mortgage (consumer) credit have contributed to this increase.
- We use microdata to focus on the main factors underlying the strong trend increase in household credit since the late 1990s. The mean level of debt has risen for all age groups, suggesting that a variety of factors are at work.
- Generally favourable income growth and low interest rates have made mortgages more affordable, supporting significant increases in home-ownership rates and mortgage debt.
- Higher house prices, financial innovation and low interest rates have underpinned the expansion in consumer credit.

Household indebtedness rose considerably in many advanced economies over recent decades. This upward trend intensified in the years preceding the recent financial crisis as ratios of household debt to disposable income rose sharply in a number of major economies (**Chart 1**). In the United States and the United Kingdom, for example, excessive easing of lending conditions led to unsustainable growth in household debt, which fuelled higher debt-service burdens and increases in house prices. Following the onset of the crisis, pressures for deleveraging in the banking and household sectors have led to significant reductions in the debt ratios in these countries.

While the ratio of household debt to disposable income also increased in the euro area, it has remained at a relatively low level. The average for the euro area, however, conceals considerable variation among individual countries. Ratios are substantially higher in the Netherlands and Ireland, for example, as well as in some northern European countries that are not members of the euro area.[1]

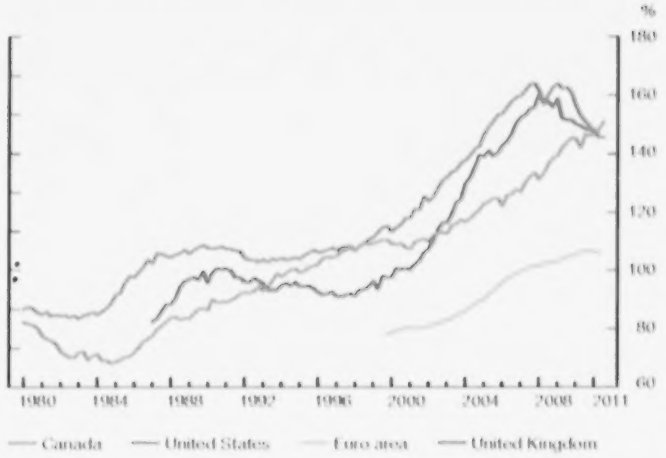
Household borrowing in Canada has followed less-pronounced swings than in some other countries in recent years, but has nevertheless maintained a steady upward trend. Credit growth has remained strong over the past decade (**Table 1**), and the ratio of debt to disposable income for Canadian households has now risen to approximately 150 per cent.[2] Before the mid-1990s, the increase in the debt-to-income ratio was driven mostly by residential mortgage

Household borrowing in Canada has followed less-pronounced swings than in some other countries in recent years, but has nevertheless maintained a steady upward trend

1 Debt-to-income ratios in those countries are greater than the peak levels observed in the United States and United Kingdom. Glick and Lansing (2010) provide international comparisons.

2 The aggregate debt-service ratio (i.e., the share of income required to make interest payments) has remained low despite the increase in debt levels, owing to historically low interest rates. Since a significant share of the increase in total debt has been used to purchase housing, the debt-to-asset ratio for the household sector has been relatively stable, although it has moved upward since 2008.

Chart 1: **Ratio of household debt to personal disposable income**



Sources: Statistics Canada, U.S. Federal Reserve, Bank for International Settlements and U.K. Office for National Statistics

Last observations: Canada, United Kingdom and United States: 2011Q3; euro area: 2011Q2

Table 1: **Measures of household debt in Canada**

	Growth of household debt (average annual rate, %)		Debt-to-asset ratio (%)
	Nominal	Real[a]	
1980–89	9.6	3.1	16.0
1990–99	5.9	3.7	16.8
2000–11	7.4	5.3	17.6

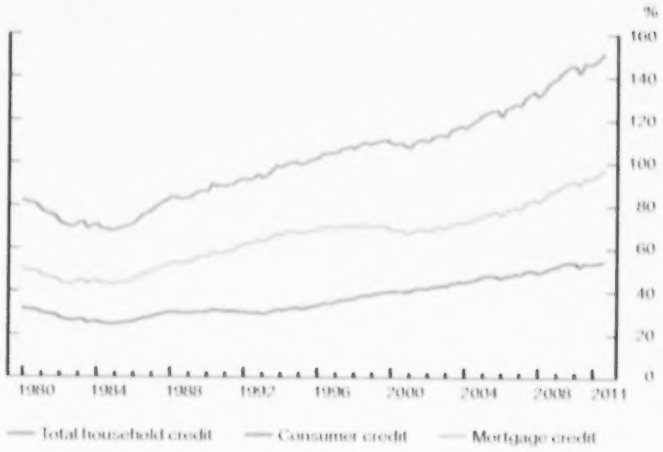
a. Deflated using total consumer price index
Source: Statistics Canada

credit, but since then, consumer credit has also been a contributing factor (**Chart 2**). The rising importance of consumer credit has coincided with a strong increase in non-mortgage borrowing secured by housing assets. The purpose of this article is to examine the major factors underlying these recent trends in household debt in Canada.

Trends in household indebtedness reflect a mix of supply and demand factors. On the demand side, an important motivation for borrowing is that it can increase a household's lifetime welfare by allowing consumption in different stages of the life cycle to differ significantly from current levels of income. Borrowing can also act as a buffer that permits a household to maintain a stable level of consumption following a temporary loss of income.

While borrowing can enhance welfare, recent international experience shows that excessive indebtedness and looser lending standards can also make households more vulnerable to adverse shocks and increase risks to the financial system. The rise in indebtedness in the United States was heavily influenced by relaxation of mortgage underwriting standards that made it easier for riskier households to enter the housing market, and by other financial innovations that made it easier for existing homeowners to access borrowing secured by home equity (Dynan and Kohn 2007). Data for the subprime segment of the mortgage market illustrate the importance of these supply factors. In the United States, the subprime market had grown

Chart 2: **Ratio of debt to personal disposable income in Canada**



Source: Statistics Canada

Last observation: 2011Q3

to account for about 14 per cent of outstanding mortgages before the financial crisis, compared with about 3 per cent in Canada.[3]

An understanding of the underlying causes of past growth in debt in Canada will provide insight into the forces likely to affect future changes in indebtedness. In turn, this information can guide analysis of both financial stability and monetary policy issues.[4] A comprehensive analysis of these questions cannot be conducted using the aggregate credit data alone, since these data mask many important aspects of borrower behaviour. The demand for credit will vary considerably across households, depending on characteristics such as age, income and home-ownership status. The willingness of lenders to supply credit will also depend on these characteristics. This means that information on the distribution of debt across different types of households is essential to help identify the factors contributing to the increase in total indebtedness. Accordingly, the findings in this article are based largely on a data set that contains information at the household level that is available from 1999 onward (**Box 1**). This time frame broadly coincides with the accelerated growth in household debt and the shift in the composition of consumer credit toward borrowing secured by home equity.

While this article focuses on explaining the broad trends in household debt, it is important to note that the implications for financial stability depend on the ability of individual households to make their debt payments when faced with adverse shocks. Assessments of the risks to financial stability arising from elevated indebtedness are provided in the *Financial System Review*, including stress tests based on the distribution of the debt-service ratio across households.

We begin by highlighting some general observations from the microdata, and then discuss the key determinants of growth in mortgage and consumer credit.

3 Box 1 in the December 2007 issue of the *Financial System Review* describes other important differences between the subprime mortgage markets in the United States and Canada before the financial crisis.

4 See Bailliu, Kartashova and Meh (this issue) for a discussion of the links between household debt and spending.

Box 1

Household Microdata

The *Canadian Financial Monitor* (CFM) survey conducted by Ipsos Reid provides comprehensive information on the balance sheets of approximately 12,000 households for each year from 1999 to the present. For the liability side of the balance sheet, there is detailed household-level information on the outstanding amounts of residential mortgage credit and five types of consumer credit (secured lines of credit, unsecured lines of credit, credit cards, leases and other consumer loans). Basic socio-economic information, including age, income, education, family size, home-ownership status and the value of housing equity, is also reported for each household. Survey responses from participating households are weighted to obtain data series that are representative of the Canadian population. This data set is used regularly by the Bank of Canada to conduct the household-sector stress tests reported in the *Financial System Review*.

Household Borrowing over Time: Age and Demographic Effects

If borrowing were not possible, household consumption would fluctuate widely over the course of a lifetime, since spending would be constrained to follow movements in current income closely over time. According to the life-cycle hypothesis, borrowing can improve a household's lifetime welfare by allowing it to spread consumption more smoothly across different stages of its life cycle. When income is relatively low during the early adult years, households will typically borrow to support higher consumption than could be financed by current income alone.[5] Conversely, as income rises during the middle years of the life cycle, households save (and reduce their debt) in order to accumulate the wealth necessary to support consumption during retirement years when income is lower. This consumption-smoothing behaviour implies an inverted-U pattern between age and indebtedness.

Chart 3 shows the mean level of debt in 2010 for households in different age categories. Consistent with the life-cycle hypothesis, indebtedness peaks in the 31–35 age range and then gradually declines with age. Mortgage credit is the primary source of changes in total debt over the life cycle. As expected, mortgage credit is particularly significant for younger households.

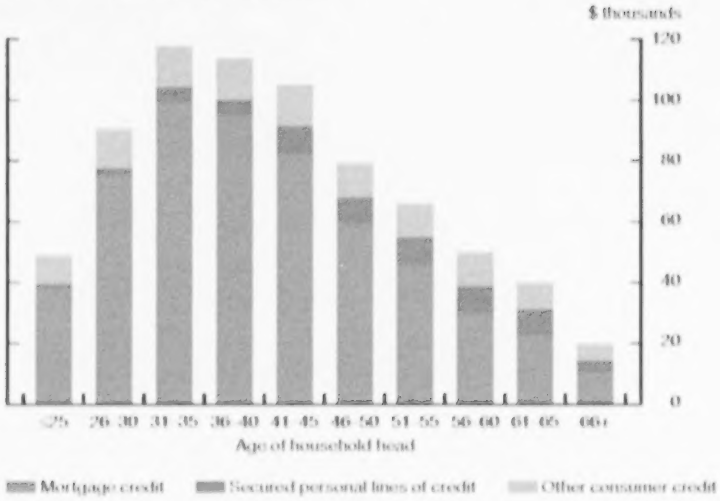
While the relationship between age and indebtedness follows a similar inverted-U shape in each year, the age differences have become greater since the late 1990s. Particularly large increases in mean debt (most notably, mortgage credit) have occurred for households in the age groups spanning 31 to 45 years (**Chart 4**).[6] These are also the age ranges in which increases in debt were most widespread across households. Secured personal lines of credit have accounted for most of the growth in total consumer credit for each age group.

Since the late 1990s, particularly large increases in mean debt have occurred for households in the age groups spanning 31 to 45 years

5 For example, young adults often choose to raise their current consumption of housing services by borrowing to purchase a house.

6 To control for the effects of inflation, Chart 4 shows the change in real debt between 1999 and 2010 (constant 2010 dollars, based on the consumer price index).

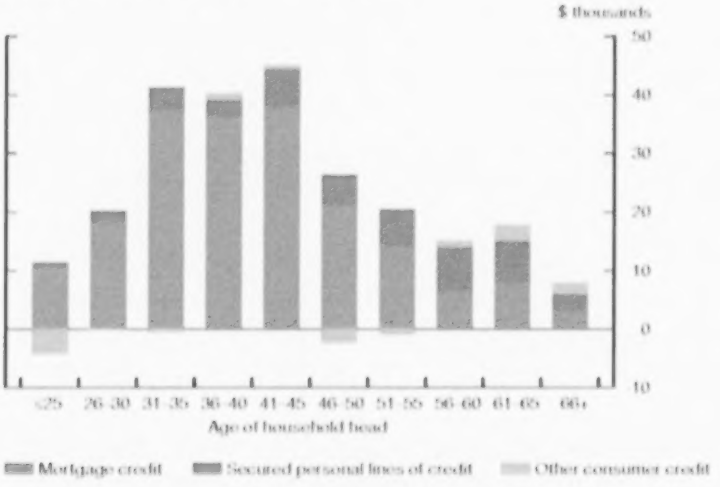
Chart 3: **Mean debt, by age group, 2010**



Sources: *Canadian Financial Monitor* and authors' calculations

Chart 4: **Change in mean debt, by age group, 1999–2010**

In 2010 dollars, based on total consumer price index



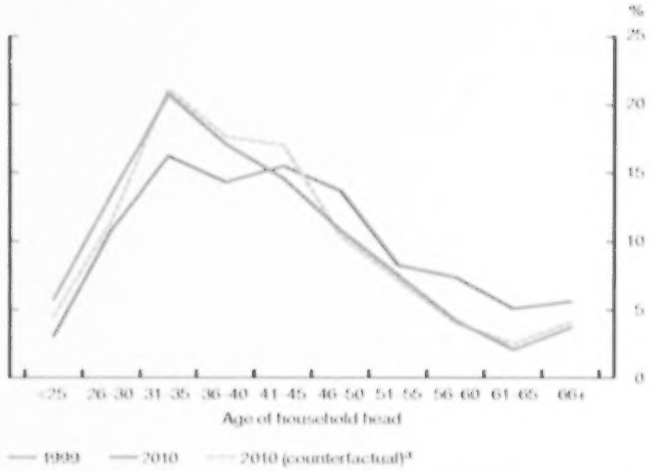
Sources: *Canadian Financial Monitor* and authors' calculations

Chart 3 and **Chart 4** provide important initial insights for understanding the causes of trend movements in household debt. The aging of the population over our sample period means that trends in aggregate credit have become increasingly influenced by older households. One consequence of the aging population is that the *proportion* of total debt held by older households has risen significantly since the late 1990s (**Chart 5**), even though they had smaller increases in indebtedness than most younger households.[7] The dashed line in **Chart 5** represents a counterfactual distribution for 2010, which assumes the demographic weights remain constant at their 1999 values, while mean debt levels for each age category rise according to their

7 The proportion of households headed by individuals older than 45 years increased by 14 percentage points between 1999 and 2010; the share of total debt held by these households rose by 12 percentage points.

Chart 5: **Distribution of household debt, by age group**

Share of total household sector debt



a. The counterfactual distribution holds the population weights for each age group fixed at 1999 levels.
Sources: *Canadian Financial Monitor* and authors' calculations

historical evolution. The counterfactual (constant age) distribution for 2010 is quite similar to the 1999 distribution, which implies that the share of total debt held by older households would have been relatively unchanged in the absence of population aging.

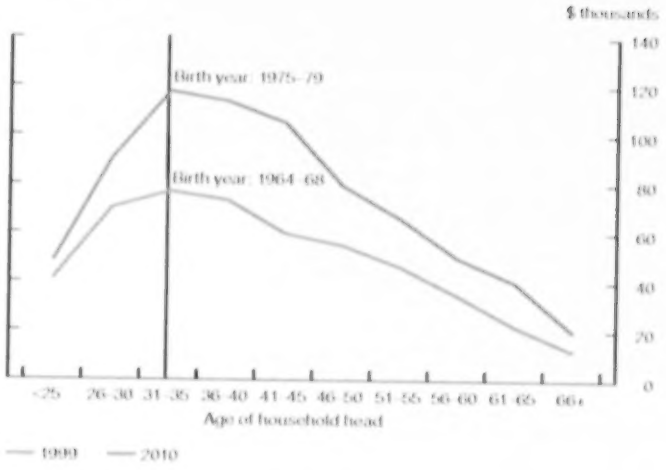
Since older households tend to have lower debt (**Chart 3**), population aging has also had a moderating effect on total household credit. Under the hypothetical scenario described above (with a constant age structure), aggregate debt would have been about 12 per cent higher in 2010. This result is only suggestive, since the level of interest rates and other lending conditions might have been different, given the greater demand for credit. It does, however, illustrate the importance of the demographic structure for understanding historical trends and projecting future growth in credit.

Since the aging population has dampened the rise in aggregate household debt, other factors must have more than offset this effect in order for the strong upward trend in indebtedness to have occurred. Mean debt levels increased for each age range between 1999 and 2010 (**Chart 4**), implying that the increase in aggregate indebtedness reflects a systematic positive "cohort" effect; that is, for each stage of the life cycle, mean debt levels are systematically greater for household heads born in later years. For example, while a typical household aged 31 to 35 years in 1999 (i.e., born between 1964 and 1968) had total real debt of approximately $75,000, a representative household in the same age range in 2010 (i.e., born between 1975 and 1979) had a mean real debt of almost $120,000 (**Chart 6**).

For each stage of the life cycle, mean debt levels are systematically greater for household heads born in later years

There are several potential explanations for the higher indebtedness of the more recent cohorts. First, increased borrowing by younger cohorts may reflect ongoing shifts in the underlying preferences in favour of current consumption relative to future consumption. Second, it could result from trend movements in the variables that affect the demand for credit (such as expected income and the cost of borrowing). Finally, new lending practices or financial innovations may have increased access to credit over time.

Chart 6: **Mean household debt, by age group**
In 2010 dollars



Sources: *Canadian Financial Monitor* and authors' calculations

It is difficult to disentangle the relative importance of these explanations. However, the broad-based nature of the increases in debt—across all age ranges and for both mortgage and consumer credit—suggests that a combination of these factors has contributed to the positive cohort effect and the trend growth in total household debt. These influences are explored further in the following sections.

Mortgage Credit

The ratio of mortgage debt to disposable income has increased significantly over the past 30 years, from about 50 per cent to almost 100 per cent (**Chart 2**). This growth is consistent with census data that show a rise in the home-ownership rate from 62.1 per cent to 63.6 per cent of households between 1981 and 1996, and a more-pronounced increase to 68.4 per cent in 2006 (CMHC 2011). *Canadian Financial Monitor* data suggest that the home-ownership rate increased further after 2006.[8] Another factor contributing to the rise in the mortgage debt-to-income ratio since the late 1990s is that house prices have risen at a faster pace than income.[9]

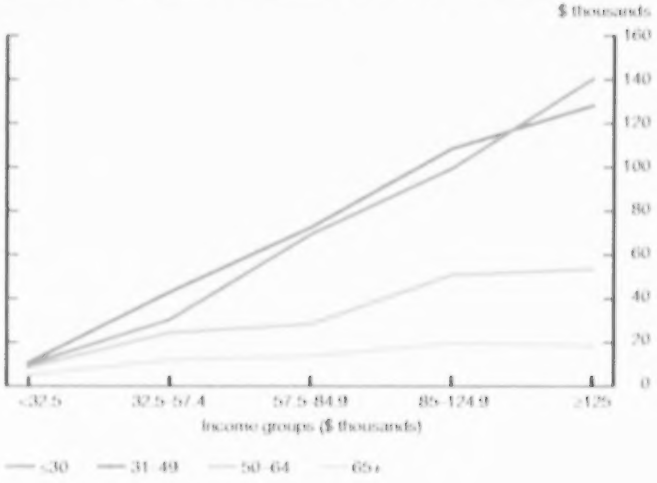
Roles of income and interest rates

Lifetime consumption-smoothing implies that current spending will depend on "permanent income," which is the present value of current and expected future income. Intuitively, a household with higher expected future earnings will use some of the expected increase in lifetime consumption to raise current spending. Thus, a household's demand for housing (and mortgage credit) should be positively correlated with indicators of its lifetime earnings, such as current income and educational attainment. Consistent with expectations, mortgage debt rises with income for households in each age group

8 The link between the long-run trends in mortgage credit and home ownership is also clear in the household-level data: similar to the cohort effects on credit discussed earlier, the rate of home ownership in recent decades has peaked at higher levels for later-birth cohorts (Hou 2010).

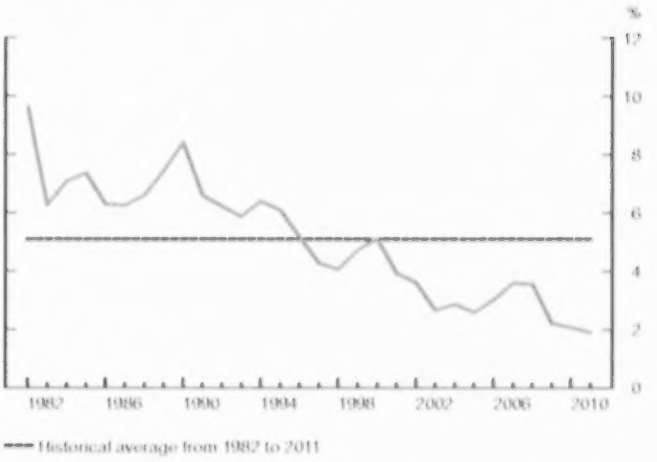
9 Increases in mortgage refinancing (in which existing homeowners increase the size of their mortgage while staying in the same house) have also contributed to the rise in total mortgage credit since the late 1990s. See Bailie, Kartashova and Moh (this issue).

Chart 7: **Mean mortgage debt, by income and age group, 2010**



Sources: *Canadian Financial Monitor* and authors' calculations

Chart 8: **Real discounted 5-year mortgage rate**



Note: The real 5-year mortgage rate is calculated as the difference between the discounted mortgage rate and the medium-term expectation of consumer price index inflation from the Towers Watson Canadian Survey of Economic Expectations.
Sources: Bank of Canada, Towers Watson, ING Canada and authors' calculations Last observation: 2011

(**Chart 7**). This relationship implies that trend increases in real household income (caused, for example, by trend growth in productivity) have contributed to the increase in home-ownership rates and higher mortgage debt.[10]

Increases in real household income and low interest rates have contributed to the increase in home-ownership rates and higher mortgage debt

A low-interest-rate environment will also lead to stronger growth in mortgage credit. The real 5-year mortgage rate was highest during the 1980s when there was a higher premium for inflation uncertainty (**Chart 8**).[11] More recently, real borrowing rates have been significantly below the 30-year average.

10 Morissette (2008) reports that earnings growth in the decade preceding 2007 was greatest for individuals in the age range of most first-time homebuyers (i.e., under 35 years). The median level of real household income (after tax) increased by 9 per cent between 2001 and 2009 (CMHC 2011).

11 The data for the real 5-year mortgage rate incorporate estimates of discounts from posted rates.

Overall housing affordability

The data for residential mortgage credit include debt related to both house purchases and mortgage refinancing. The movements in income and interest rates described above would have supported growth in both of these forms of mortgage credit. To provide further perspective on credit growth related to house purchases, we use a comprehensive measure of the overall affordability of mortgage payments that takes into account house prices as well as mortgage rates and income.

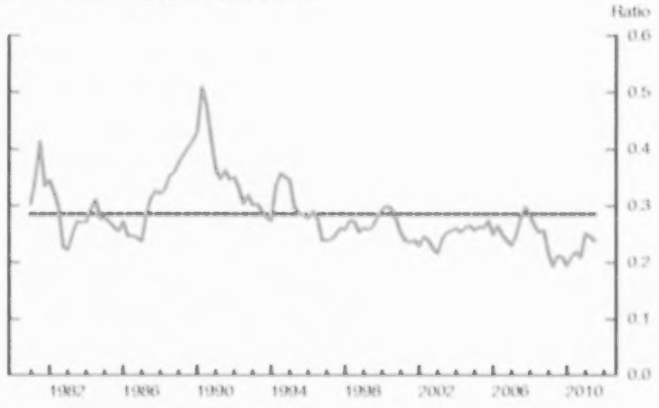
The affordability measure (AFF) is defined as the ratio of monthly mortgage payments to disposable income (DI):

$$\mathbf{AFF} = \frac{\frac{r}{(1-(1+r)^{-N})}M}{\mathbf{DI}}.$$

The monthly payment depends on the mortgage rate r; the maximum amortization period in months N; and the total value of the mortgage M. For example, with a 95 per cent loan-to-value ratio, the mortgage size M is equal to 0.95 x P, where P is the purchase price of the average house. An increase in the AFF ratio indicates a decrease in affordability. Higher house prices and interest rates lower affordability, while a higher income (DI) and a longer amortization period increase affordability and improve access to mortgage financing.[12]

This measure of affordability has been consistently favourable by historical standards since the late 1990s (**Chart 9**). Despite increases in house prices, generally favourable labour market conditions (gains in real income) and low interest rates have supported affordability and contributed to the significant increases in home ownership and mortgage debt.

Chart 9: **Ratio of mortgage affordability**



Note: This measure estimates the size of mortgage payments for a first-time homebuyer, given prevailing interest rates and house prices, and then scales this value by personal disposable income. A higher value of this ratio represents lower affordability.
Source: Bank of Canada calculations Last observation: 2011Q3

12 This measure is the same as the affordability series available on the Bank of Canada's website (reported in the Credit Conditions dashboard at <http://credit.bank-banque-canada.ca/financialconditions#hai>), with the exception that it uses historical data for the maximum amortization period rather than assuming a constant 25-year maximum amortization.

Quantitative evidence of the impact of mortgage affordability is obtained from analysis using household-level data (**Box 2**). The results confirm that changes in affordability have a significant effect on mortgage credit. They also suggest that an easing of affordability would have a greater impact on the housing decisions of younger age groups, which is consistent with the micro evidence on the growth in mortgage debt by age groups (**Chart 4**).

An easing of affordability would have a greater impact on the housing decisions of younger age groups

Box 2

Mortgage Affordability and Home Ownership

Greater insight into the determinants of mortgage credit is obtained by examining the factors that influence the decision of renters to buy a house. We use a subset of the *Canadian Financial Monitor* microdata containing only those households that appear in the sample in consecutive years. We then use a probabilistic regression model (commonly known as a *probit* model) to estimate the impact of demographic and economic variables on the probability of a household transitioning from a renter to a homeowner. These variables include the household's size, ability to afford a mortgage and capacity to make a down payment. The affordability variable is similar to the aggregate measure shown in **Chart 9**, although it exploits more disaggregated information by using household-specific data for income and regional house prices.

Table 2-A shows the estimated impact of affordability on the probability of a renter becoming a homeowner (transition probability) in 2010 based on the probit model. Column (A) in the middle panel of the table reports the transition probability for selected age groups if home ownership were more affordable than was actually observed in 2010, while column (C) shows the probability under an assumed value for affordability that would be closer to the longer-run average value. Based on these estimated probabilities, tighter affordability would have resulted in approximately 36,000 fewer renters entering the housing market in 2010 (or approximately 10 per cent of the estimated activity by first-time homebuyers in 2010). As illustrated by the shaded column in the table, changes in affordability have a greater impact on the decisions of younger households.

Table 2-A: **Impact of mortgage affordability on the probability of a house purchase in 2010**

	Transition probability			Change in transition probability
Age group	0.75 × actual affordability (A)	Actual 2010 affordability (B)	1.25 × actual affordability (C)	(C) – (B)
18–35	0.156	0.144	0.133	-0.012
46–54	0.095	0.086	0.078	-0.008
All	0.105	0.095	0.085	-0.010

These estimates are only illustrative: they do not reflect all channels through which changes in affordability would affect housing decisions and the amount of outstanding mortgage credit. By focusing on the transition from renter to homeowner, the estimates capture only the entry decisions of first-time homebuyers; they do not show the impact of affordability on the size of the mortgage (for households that purchase) or the impact on repeat buyers. Nevertheless, the results suggest that changes in affordability have been an important factor in the rise in mortgage credit since the late 1990s.

Consumer Credit

As shown in **Chart 2**, the ratio of consumer debt to disposable income was relatively stable until the mid-1990s when it began to move persistently higher. The predominant source of this upward trend has been secured personal lines of credit (PLCs), which grew at a much faster pace than more traditional forms of consumer credit such as credit card debt. Secured PLCs, which are mostly secured by housing assets (i.e., home-equity lines of credit), have risen sharply both in absolute terms and as a share of total consumer credit. In 1995, secured PLCs represented about 11 per cent of consumer credit; by the end of 2011, this share was close to 50 per cent (**Chart 10**).

The rapid increase in the importance of secured PLCs implies that identifying the causes of this growth is critical to understanding the overall trend in consumer credit. Some of the factors described earlier that supported growth in mortgage credit, such as income growth and low interest rates, would have had similar effects on consumer credit.

The strong growth in secured consumer debt is also linked to other interconnected factors. Significant gains in house prices over this period have eased borrowing constraints for some households by raising the amount of collateral available to support borrowing against home equity (**Chart 10**).[13] Financial innovation that made it easier for households to access this type of borrowing has probably been another important factor. For example, while PLCs have been available in Canada for some time, anecdotal information suggests that marketing of these products was stronger after the mid-1990s, and the range of PLC products was expanded to appeal to a larger segment of the population. The broader use of secured consumer credit is illustrated by the significant increase in the proportion of households with a positive secured PLC balance within each age group (**Chart 11**).

A key question for identifying the causes of the rising consumer debt-to-income ratio is the extent to which the growth in secured consumer credit reflects a substitution away from higher-cost unsecured debt such as credit cards, rather than a net increase in consumer credit. Some substitution has undoubtedly taken place. Since the spread between the typical interest rates for unsecured consumer debt and a secured PLC is approximately 250 basis points, there is a strong incentive for households to consolidate existing debt into a PLC to reduce debt payments,[14] and to use the secured account for new borrowing.

It is likely that the factors contributing to the growth in home-equity borrowing, however, led to stronger growth in total consumer credit than would otherwise have occurred. It is noteworthy that the beginning of the strong rise in the ratio of consumer debt to income in the mid-1990s coincided with the accelerated increase in the share of PLCs in total consumer credit. Moreover, as noted earlier, increases in house prices and broader access to secured borrowing would have raised indebtedness for credit-constrained households. Finally, even some households that are not credit constrained may have increased their total debt, since expanded access to secured PLCs lowers the effective cost of borrowing. Therefore, financial innovation and increases in house prices have probably been significant factors underlying the increase in total consumer credit.[15]

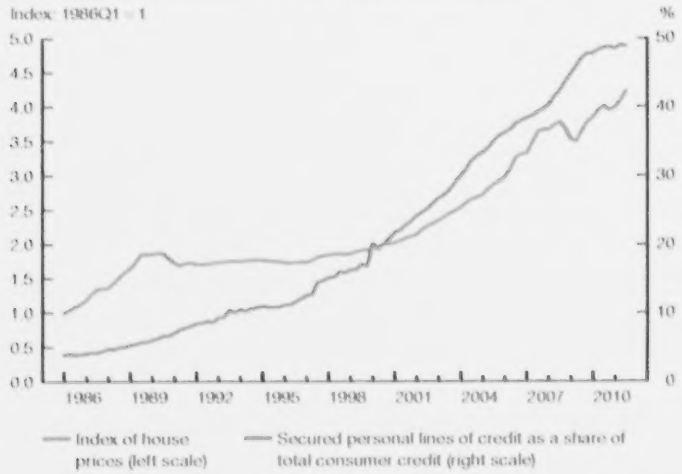
The beginning of the strong rise in the ratio of consumer debt to income in the mid-1990s coincided with the accelerated increase in the share of PLCs in total consumer credit

13 Grant (2003) and Crook and Hochguertel (2007) report international evidence on the incidence and characteristics of credit-constrained households.

14 Bailliu, Kartashova and Meh (this issue) provide evidence on the use of home-equity lines of credit for debt consolidation.

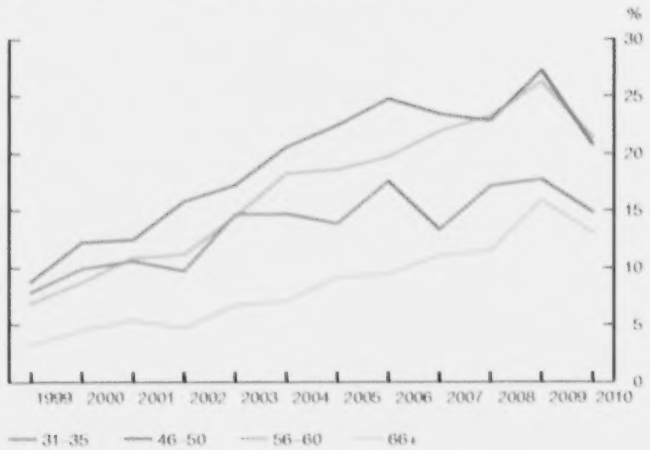
15 Future research will seek to obtain additional empirical evidence on the relative importance of changes in borrowing constraints and other determinants of growth in household credit.

Chart 10: **Secured personal lines of credit and house prices**



Note: House prices are based on a combination of the levels of average house prices from the Teranet–National Bank National Composite House Price Index and the Canadian Real Estate Association (CREA) Multiple Listing Service. The series for secured personal lines of credit (PLCs) is obtained by adjusting total PLCs at chartered banks to account for securitization, lending by other financial institutions and unsecured lines of credit.
Sources: Bank of Canada, Teranet, CREA and authors' calculations Last observation: 2011Q3

Chart 11: **Proportion of households in selected age groups with a positive secured personal line of credit balance**



Sources: *Canadian Financial Monitor* and authors' calculations Last observation: 2010

Conclusions

Similar to the experiences in many other countries, measures of household indebtedness in Canada have exhibited an upward trend over the past 30 years. In this article, we use microdata to focus particularly on the reasons for the continued increases since the late 1990s. Population aging has had a moderating effect on the overall growth in credit over this period, but this influence has been more than offset by a strong positive cohort effect; that is, for each stage of the life cycle, the mean level of household debt is systematically greater for cohorts born in later years. The widespread nature of the increases—across all age groups and in both mortgage and consumer credit—suggests that a variety

of factors, such as low interest rates, higher house prices and financial innovation, have contributed to the growth in total household debt.

A goal of future research will be to provide further evidence on the relative importance of the various determinants of growth in household credit. It will also be important to monitor the impact of new financial innovations on debt levels. This work will improve our understanding of the forces affecting future growth in household debt.

Literature Cited

Bailliu, J., K. Kartashova and C. Meh. 2012. "Household Borrowing and Spending in Canada." *Bank of Canada Review* (this issue): 16–29.

Canada Mortgage and Housing Corporation (CMHC). 2011. "Appendix A: Key Housing and Finance Statistics." *Canadian Housing Observer 2011*.

Crook, J. and S. Hochguertel. 2007. "U.S. and European Household Debt and Credit Constraints: Comparative Micro Evidence from the Last 15 Years." Tinbergen Institute Discussion Paper No. 2007-087/3.

Dynan, K. and D. Kohn. 2007. "The Rise in U.S. Household Indebtedness: Causes and Consequences." The Federal Reserve Board, Finance and Economics Discussion Series No. 2007-37.

Glick, R. and K. Lansing. 2010. "Global Household Leverage, House Prices, and Consumption." *Economic Letter* 2010-01. Federal Reserve Bank of San Francisco, 11 January.

Grant, C. 2003. "Estimating Credit Constraints Among U.S. Households." European University Institute Working Paper No. 2003/14.

Hou, F. 2010. "Homeownership over the Life Course of Canadians: Evidence from Canadian Censuses of Population." Analytical Studies Branch Research Paper Series. Statistics Canada, Cat. No. 11F0019M — No. 325.

Morissette, R. 2008. "Earnings in the Last Decade." *Perspectives on Labour and Income* 9 (2). Statistics Canada, Cat. No. 75-001-X (February): 12–24.

Household Borrowing and Spending in Canada

Jeannine Bailliu, Katsiaryna Kartashova and Césaire Meh, Canadian Economic Analysis Department

- The sizable increase in the ratio of household debt to income in Canada over the past decade has coincided with a period of sustained strong growth in house prices. The main driver of the rise in household debt has been home-equity extraction—household borrowing against equity in existing homes through increases in mortgage debt and draws on home-equity lines of credit.
- Understanding how households use their borrowed funds is important for assessing the macroeconomic effects of increased household borrowing and for the conduct of monetary policy. If, for example, increases in household debt are used primarily for consumption and home renovation, a fall in house prices that reduces home equity could decrease household borrowing and spending.
- The evidence indicates that a significant share of borrowed funds from home-equity extraction was used to finance consumption and home renovation in Canada from 1999 to 2010. Such indebtedness constitutes an important source of risk to household spending, since it makes households more vulnerable to a potential decline in house prices.

Household debt in Canada has been rising relative to income for many decades, but the rate of increase has accelerated since the late 1990s, so that by the third quarter of 2011, it stood at more than 150 per cent of personal disposable income. A number of factors may have contributed to this sizable growth in household debt, including financial innovation, relatively low interest rates and rising house prices accompanied by high levels of borrowing against home equity.[1, 2]

In general, household borrowing can be used for a variety of purposes, such as purchasing or renovating a home, buying goods and services, investing in financial and non-financial assets, or repaying debt. Understanding how households use their borrowed funds, particularly how much of their increased debt loads are used to finance both household consumption and home renovation, is important for the conduct of monetary policy and for assessing the macroeconomic effects of increased household borrowing.[3] For example, if increases in household debt are used primarily for spending,

1 Crawford and Faruqui (this issue) identify trends in the level and composition of household debt in Canada and discuss the major factors that explain these trends.

2 Peterson and Zheng (this issue) explore the key factors behind the medium-run fluctuations in Canadian house prices.

3 See Carney (2011a, b) and Côté (2011) for more on the economic and financial implications of household borrowing in Canada.

a fall in house prices that reduces home equity could decrease household borrowing and consumption (i.e., owing to a reduction in the value of the collateral).

In this article, we examine the sources and uses of household borrowing between 1999 and 2010,[4] particularly home-equity extraction, i.e., borrowing against equity in existing houses through increases in mortgage debt and draws on home-equity lines of credit (HELOCs), to finance consumer spending, outlays for home renovation, debt repayment, and financial and non-financial investments. To assess how the accumulation of debt is related to household consumption and home renovation, we use the comprehensive data set, the *Canadian Financial Monitor* (CFM), which includes information on the uses of debt by Canadian households. This data set covers a significant period of time and the information is not available from other sources; however, it relies on household self-reporting and is therefore subject to the usual caveats regarding household survey data. For example, since financing is fungible, the initial motivation for a certain type of borrowing does not tell everything about how it is used. Nevertheless, this data set provides useful information for understanding the relationship between household borrowing and spending.

The article is organized as follows. We first present some facts regarding the evolution of Canadian household debt over the period from 1999 to 2010, emphasizing the increased importance of debt flows secured by housing. We then explore how Canadian households have used their borrowed funds over the same period, and assess the role of these borrowed funds in financing total consumption and spending on home renovation. We also examine the possible effects of a decline in house prices on consumption when household indebtedness is supported by housing equity as collateral.

Canadian Household Debt from 1999 to 2010

The rise in the ratio of household debt to income in Canada from 1999 to 2010 coincided with a period of rising house prices (**Chart 1a** and **Chart 1b**). Given that different types of debt may be used for a variety of purposes, we disaggregate household debt flows to permit identification of their use.

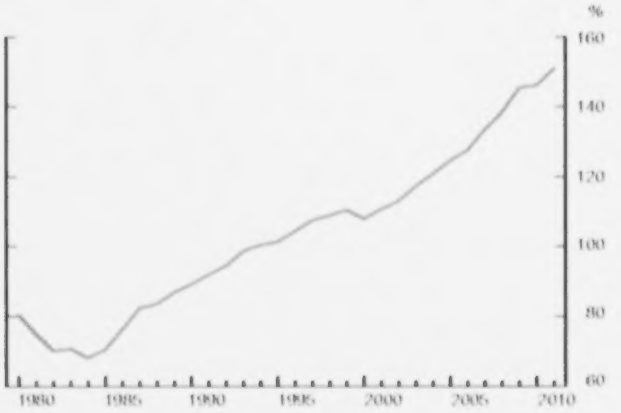
The commonly used classification of household debt flows into mortgage debt flows and consumer debt flows[5] does not directly address our objective, since, in addition to debt secured by housing (e.g., HELOCs), consumer debt flows include unsecured debt (e.g., credit card debt). We therefore group these disaggregated flows of household debt according to whether or not they are secured by housing.

This results in three broad categories: (i) consumer debt flows not secured by housing; (ii) home-equity extraction; and (iii) mortgage debt flows associated with the purchase of newly constructed houses. The first category, consumer debt flows not secured by housing, is defined as all unsecured debt and debt secured by an asset other than housing and includes unsecured personal lines of credit and loans, credit cards, and automobile loans. The second category, home-equity extraction, is defined as the conversion by households of their housing equity into cash by borrowing, which can take three forms: (i) net mortgage refinancing, where homeowners increase the size of their mortgage or amortization term while staying in

4 We focus on this time period because our analysis draws on information from a micro data set that is only available as of 1999.

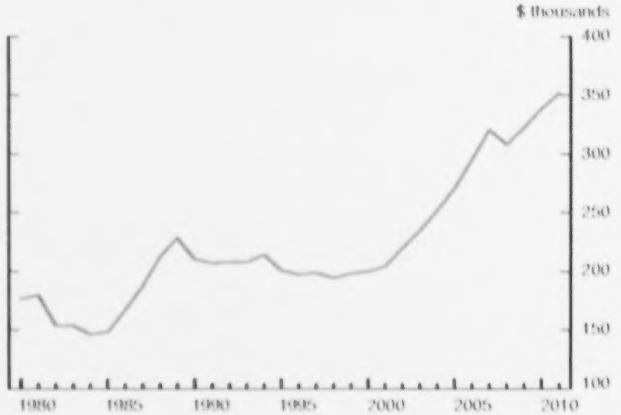
5 This is the classification used by Crawford and Faruqui (this issue).

Chart 1a: **Ratio of household debt to income**



Note: The value for 2011 is the value for 2011Q3.
Source: Statistics Canada
Last observation: 2011

Chart 1b: **Real house prices in Canada**
Deflated by consumer price index, rebased to 2010



Sources: Canadian Real Estate Association and Statistics Canada
Last observation: 2011

the same home;[6] (ii) draws on HELOCs;[7] and (iii) changes in mortgage debt outstanding owing to changes in the ownership of existing homes. Such a change in ownership may affect the stock of debt if there is a difference between any mortgage debt outstanding repaid by the seller and any mortgage debt undertaken by the buyer to finance the purchase of a home.

Grouping the debt flows into these three categories allows us to match debt flows with information from the CFM on how households use the funds provided by different debt instruments (**Box 1**). Funds from home-equity extraction and consumer debt flows not secured by housing can be directly used for a variety of purposes such as consumption and home renovation, as well as investment in financial and non-financial assets. In the next section, we use CFM survey results to estimate the proportions of these debt flows used for such purposes. Since data on the use of mortgage debt associated with the purchase of newly constructed houses are not available, we assume that these debt flows are used solely for that purpose. This assumption would be valid for credit-constrained households that have saved just enough for the down payment and that are more likely to allocate their entire borrowing to the purchase of the house (Gervais 2002). However, some households can take a bigger mortgage and use a portion of it for the purchase of the house and the rest for other purposes, such as consumption and home renovation. Hence, our analysis could underestimate the extent of household debt flows used for consumption and home renovation.

The large increase in total household debt since 1999 consisted primarily of home-equity extraction

Two key findings emerge from analyzing these categories of household debt flows. First, the large increase in total household debt since 1999 consisted primarily of home-equity extraction, which increased from around 2.2 per cent of disposable income in 1999 to a peak of 9 per cent in 2007 (**Chart 2a**). By comparison, mortgage debt flows associated with the purchase of newly constructed houses grew only modestly, from 2.3 per cent of disposable income in 1999 to 3.4 per cent at their peak in 2009, while consumer debt

6 Existing data from the Canadian Association of Accredited Mortgage Professionals (CAAMP) and the CFM do not take into account changes in amortization terms when calculating net mortgage refinancing, potentially underestimating the amount of equity extraction they report.

7 This category also includes home-equity loans (i.e., non-mortgage loans secured by a home).

Box 1

Constructing Home-Equity Extraction

To construct the household debt flows used in this article, particularly home-equity extraction, we build on Greenspan and Kennedy (2005, 2007), who estimate levels of home-equity extraction for the United States (see Kartashova forthcoming). The items used in the decomposition of the household debt flows from 1999 to 2010 are summarized in **Table 1-A**.

Table 1-A: The components of debt flows secured against home equity

Mortgage debt flows	
Total residential mortgage originations	Total residential mortgage repayments
• (*a*) To buy existing homes	• (*d*) Cancellation of mortgages outstanding on existing homes sold

• (*b*) To refinance existing mortgages due to
  • change in the lender
  • increase in the mortgage amount
  • increase in the mortgage amortization period
  • decrease in interest rates
	• (*e*) Cancellation of balances outstanding on existing mortgages refinanced due to
	  • change in the lender
	  • increase in the mortgage amount
	  • increase in the mortgage amortization period
	  • decrease in interest rates

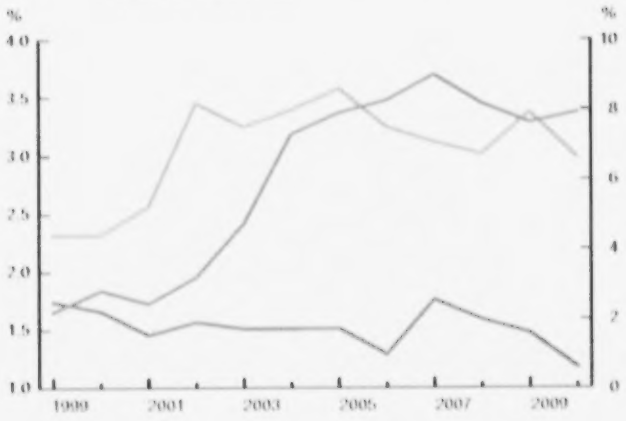
• (*c*) To buy newly constructed houses	• (*f*) Unscheduled mortgage payments • (*g*) Scheduled mortgage payments
• (*h*) Net draws on home-equity lines of credit (HELOCs)	

Using this decomposition, *home-equity extraction* equals the sum of the net change in mortgage debt outstanding owing to a change in ownership of existing homes (i.e., $a - d$), net mortgage refinancing (i.e., $b - e$) and net draws on HELOCs (h), less unscheduled mortgage amortization payments (f); *mortgage debt flows associated with the purchase of newly constructed houses* are simply given by (c).

Data sources

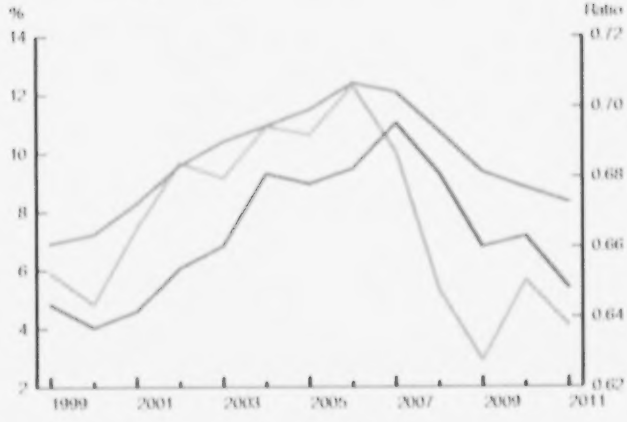
The data used to construct the debt flows are drawn from various sources and are both aggregate and micro-level data for the 1999–2010 period. For residential mortgages and consumer debt flows, we use data from Statistics Canada's National Balance Sheet Accounts for the persons and unincorporated businesses sector, as well as the Bank of Canada's *Banking and Financial Statistics* (BFS). To construct total mortgage originations, we use the Canada Mortgage and Housing Corporation (CMHC) survey on lending activity for the composition of mortgage approvals between different types of lenders, and the Office of the Superintendent of Financial Institutions *Mortgage Loans Report* (E2) for originations by chartered banks. For the decomposition of mortgage originations between new and existing homes, we use Multiple Listing Service (MLS) statistics from the Canadian Real Estate Association, the CMHC *Renovation and Home Purchase Report*, the CMHC Market Absorption Survey and the CMHC Starts and Completions Survey. To estimate mortgage cancellations on existing home sales, we use data from the *Canadian Financial Monitor* (CFM) to obtain an estimate of the distribution of balances outstanding on existing home sales and MLS home-unit sales. To construct unscheduled and scheduled amortization payments, we use CFM data to obtain the rate of prepayment, the average interest rate and the average term to amortization on mortgage balances outstanding. For HELOCs, we also use data from the CFM and the BFS.

Chart 2a: **Household debt flows relative to personal disposable income**



Sources: Statistics Canada and authors' calculations based on Kartashova (forthcoming) Last observation: 2010

Chart 2b: **Aggregate housing-equity ratio and its components**



Source: Statistics Canada Last observation: 2011Q3

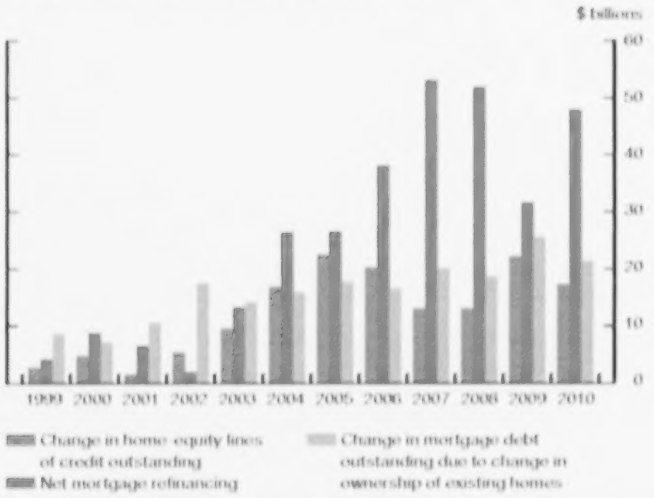
flows not secured by housing initially increased and then decreased over this period. Before 2003, net flows of consumer debt not secured by housing were similar to those associated with home-equity extraction. More recently, however, the vast majority of borrowed funds available to finance household spending on consumption and home renovation consist of home-equity extraction. Overall, home-equity extraction underpinned the robust rate of mortgage growth from 1999 to 2007. However, the value of the housing stock increased faster than mortgage debt, thereby implying a rise in the housing-equity ratio over the same period (**Chart 2b**).[8]

Second, the increase in home-equity extraction consisted mainly of net mortgage refinancing (**Chart 3**), which could be partly explained by rising housing prices from 1999 to 2010. Draws on HELOCs have also risen significantly since 1999 and increased markedly during the recent recession. Indeed, in 2009, net draws on HELOCs represented almost a quarter of the total increase in household debt, since households may have borrowed to compensate for the temporary decline in income during the recession. Some of this increase in HELOCs was also at the expense of mortgage refinancing, owing to relatively low interest rates on HELOCs. As well, HELOCs provide more flexibility in terms of draws and repayments, while mortgage refinancing requires that repayment of additional funds begin immediately.

The increase in home-equity extraction consisted mainly of net mortgage refinancing, [while] draws on home-equity lines of credit increased markedly during the recent recession

8 This is the measure of housing equity constructed by Statistics Canada, which does not include HELOCs.

Chart 3: **Components of home-equity extraction**



Source: Authors' calculations based on Kartashova (forthcoming) Last observation: 2010

The Uses of Borrowed Funds

To examine how Canadian households allocate their borrowed funds, we draw on the CFM microdata set, which collects detailed information on many aspects of household finances. This data set is unique in that it provides information on the uses of household borrowing, so we do not have to infer them indirectly, as is done in some studies in the literature.[9, 10] Based on the uses of debt supplied in the CFM, we classify the purposes of borrowing into five broad categories: consumption,[11] home renovation, financial investment, non-financial investment[12] and debt repayment.

Home-equity extraction

The uses of total home-equity extraction reported in **Chart 4** are constructed as a weighted average of its three forms—mortgage refinancing, HELOCs and changes in mortgage debt outstanding owing to changes in the ownership of existing homes. The details of the uses of each form can be found in Kartashova (forthcoming).

Overall, the average share of home-equity extraction that is used to finance consumption and home renovation has been significant, at about 40 per cent, and remained relatively stable from 1999 to 2010 (**Chart 4**). About 34 per cent of the funds were used for financial and non-financial investments. The remaining 26 per cent were used to repay debt. These findings on the uses of home-equity extraction are consistent with those of other studies for the same period, which find that the majority of funds from home-equity extraction were used for consumption and home renovation.[13]

The average share of home-equity extraction that is used to finance consumption and home renovation has been significant

9 See Mian and Sufi (2011), for example.

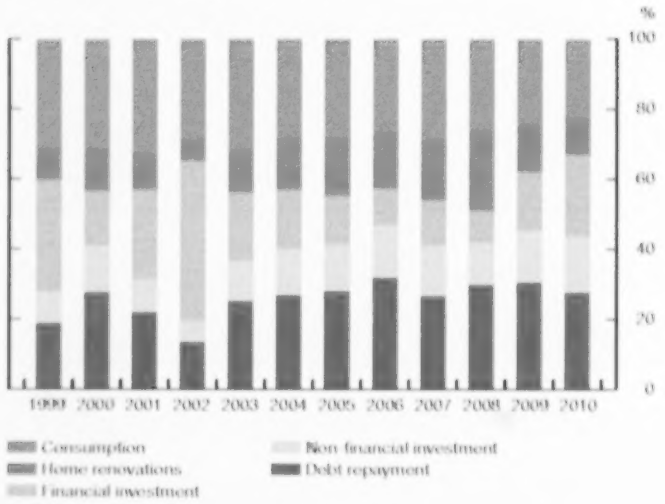
10 The CFM provides information on mortgage refinancing starting only in 2007. Thus, for the previous years, we assign average values based on known values for the period from 2007 to 2010.

11 Borrowing for consumption includes borrowing for current spending, vacation spending, and the purchase of vehicles and other big-ticket items, as well as the repayment of student loans.

12 Since this category corresponds to the CFM category "To purchase residence/business," we cannot separate the amount allocated to "residence." If this amount is large, our analysis may underestimate the household exposure to house prices.

13 See Mian and Sufi (2011) and Cooper (2010) for similar analyses in the United States, and Disney and Gathergood (2009) for a comparison between the United Kingdom and the United States.

Chart 4: **Uses of home-equity extraction**



Sources: *Canadian Financial Monitor* and authors' calculations based on Kuftashova (forthcoming)

Last observation: 2010

Consumer debt flows not secured by housing

In our analysis, the majority of consumer debt flows not secured by housing (73 per cent, on average) were used to finance consumption, a share that has been fairly stable over time. The remaining funds were allocated to debt repayment (14 per cent),[14] financial investment (6 per cent), home renovation (5 per cent) and non-financial investment (2 per cent).

The Role of Borrowed Funds in Financing Consumption and Home-Renovation Expenditures

To determine the extent to which household expenditures on consumption and home renovation have been financed by total flows of home-equity extraction and consumer debt not secured by housing, we aggregate these flows and their uses from 1999 to 2010.[15] For information on the theoretical relationship between household borrowing and spending, see **Box 2**.

Consumption

From 1999 to 2010, home-equity extraction and consumer debt flows not secured by housing together financed an average of close to $36 billion per year of consumer expenditures, or about 4.8 per cent of total consumption (**Chart 5**). This share increased steadily from the beginning of the period, peaking at 7.2 per cent in 2007, and has since declined, but remained higher in 2010 (at 4.5 per cent) than in 1999 (at 3.3 per cent). This behaviour largely followed the trajectory of the growth in household debt, since together these two debt flows constitute the majority of total debt

14 For example, renters may use unsecured lines of credit to repay their credit card balances, which are more costly.

15 The consumer debt flows not secured by housing include home-equity extraction used for consumer debt repayment and thus may underestimate the amount of consumption actually funded by home-equity extraction. At the end of this section, we provide an alternative higher estimate of the consumption funded by home-equity extraction by adding debt repayment from home-equity extraction to consumption.

Box 2

Household Borrowing and Spending: Their Theoretical Relationship

In general, households borrow to smooth consumption over their life cycle and to insure against uncertain events such as shocks to income. There are four widely discussed theoretical channels through which household borrowing, particularly against housing equity, can influence household spending. First, for households with a *long* expected housing tenure that are not financially constrained when making consumption decisions, the propensity to borrow against housing equity for consumption is zero (Sinai and Souleles 2005; Buiter 2010). To illustrate this, Campbell and Cocco (2007) state the following: "Housing is a consumption good, and for a homeowner who expects to live in his current house for a very long time, a higher house price is simply compensation for a higher implicit rental cost of living in the house. In other words, as Sinai and Souleles (2005) point out, homeowners with a long expected tenure are perfectly hedged against fluctuations in rents and the corresponding fluctuations in house prices. These fluctuations, however large they may be, have no *real* wealth effect, and absent any substitution effects, should not affect consumption choices."

Second, for households that have a *short* housing tenure and plan to consume part of their housing capital before death, the propensity to borrow against housing equity for consumption is positive. This propensity to borrow is strongest for older homeowners with shorter life horizons and housing tenure (Campbell and Cocco 2007).

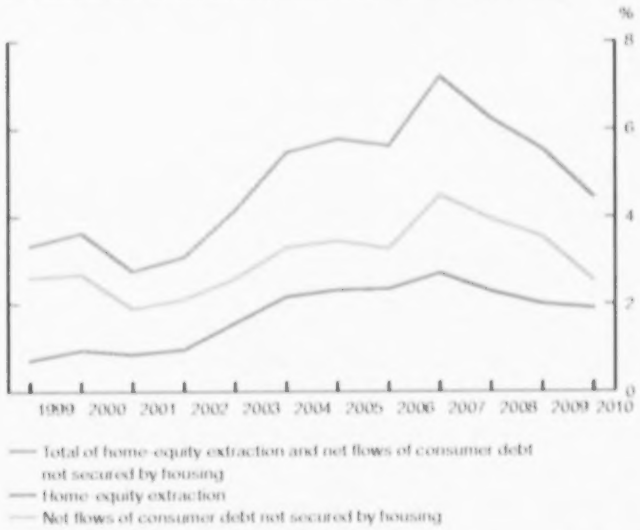
Third, for credit-constrained households, the propensity to borrow against increased housing equity is also positive, since these homeowners want to borrow more today to smooth consumption but are unable to do so because they have limited collateral (Iacoviello 2005). These homeowners would borrow more against increases in home equity to relax their budget constraints.

Finally, households that have a recurring urge for immediate consumption may aggressively borrow against their increased access to housing equity in order to finance current consumption (Laibson 1997). Although planning to be patient in the future, a household may nevertheless overspend when the future becomes the present. If households cannot restrain this behaviour, they will over-consume and over-borrow (Krusell and Smith 2003).

flows. Overall, the growth rate of consumption and the share of these borrowed funds used for consumption remained fairly stable between 1999 and 2010.

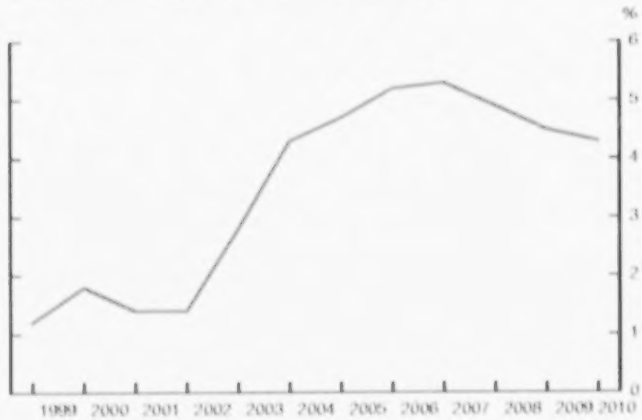
The share of consumption financed by home-equity extraction more than doubled over our sample period. However, this estimate takes into account only direct financing of consumption, i.e., household reports of debt used for consumption. A broader estimate of this share would include the indirect financing of consumption through the use of home-equity extraction to repay consumer debt not secured by housing, which was originally incurred to pay for consumption (see Greenspan and Kennedy 2007). The resulting share of consumption financed by home-equity extraction would be significantly higher (**Chart 6**), further highlighting the importance of home-equity extraction for consumption.

Chart 5: **Share of total consumption financed by home-equity extraction and net flows of consumer debt not secured by housing**


%
8
6
4
2
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Total of home-equity extraction and net flows of consumer debt not secured by housing
Home-equity extraction
Net flows of consumer debt not secured by housing

Source: Authors' calculations based on Kartashova (forthcoming) Last observation: 2010

Chart 6: **Share of total consumption financed by home-equity extraction used for consumption and debt repayment**



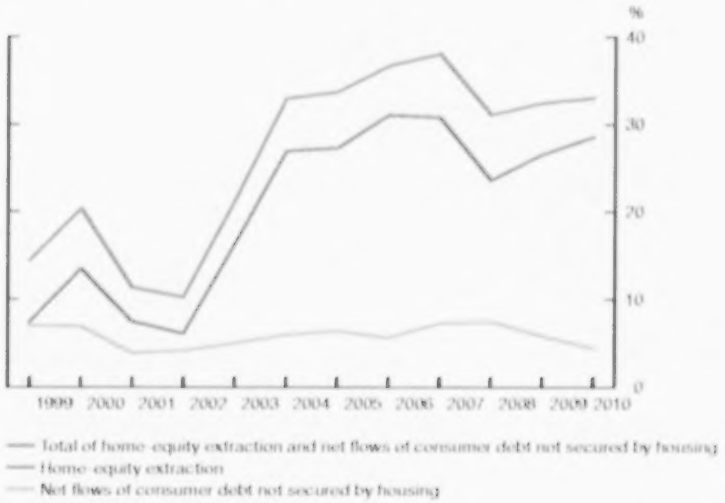
Source: Authors' calculations based on Kartashova (forthcoming) Last observation: 2010

Spending on home renovation

The proportion of spending on home renovation financed by net debt flows has, on average, been much higher than the proportion of consumption financed by debt (**Chart 7**). This may be because, in general, spending on home renovation is a "big-ticket item" that requires a larger amount of discrete financing than does consumption. From 1999 to 2010, home-equity extraction and consumer debt flows not secured by housing combined financed an average of $8 billion per year of spending on home renovation, or about 26 per cent of the total. Similar to consumption, the share of home-renovation spending financed by debt increased over the period, reaching its peak of 38 per cent in 2007. The sustained increase in the share of spending on home renovation financed by debt could be attributed to high

The proportion of spending on home renovation financed by net debt flows has, on average, been much higher than the proportion of consumption financed by debt

Chart 7: **Share of total home-renovation spending financed by home-equity extraction and net flows of consumer debt not secured by housing**


%
40
30
20
10
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Total of home-equity extraction and net flows of consumer debt not secured by housing
Home-equity extraction
Net flows of consumer debt not secured by housing

Source: Authors' calculations based on Kartashova (forthcoming) Last observation: 2010

house prices, which increased housing equity, and financial innovation, which improved household access to this equity, among other factors.

Home-equity extraction contributed disproportionately more to spending on home renovation than did consumer debt flows not secured by housing, a trend that has been most pronounced since 2002. The share of spending on home renovation financed by home-equity extraction remained high during the recent recession, as households took advantage of fiscal incentives and relatively low interest rates. At the same time, this share also increased in relative terms, given that, as with consumption, consumer debt flows not secured by housing declined.

In summary, the growth in the size of shares of consumption and home-renovation spending financed by debt flows indicates that borrowing, particularly home-equity extraction, has played an important role in financing household expenditures. This suggests that household spending on consumption and home renovation can become vulnerable to house-price shocks, since lower house prices would reduce the value of housing collateral and thus decrease household borrowing (**Box 3**).

Household spending on consumption and home renovation can become vulnerable to house-price shocks, since lower house prices would reduce the value of housing collateral and thus decrease household borrowing

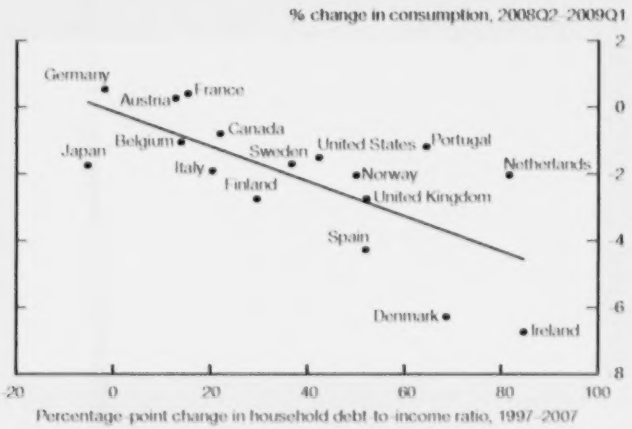
Box 3

Illustrating How a Decline in House Prices Could Affect Consumption

To illustrate the impact of a correction in house prices on consumption through the collateral channel, we start by presenting cross-country evidence on the correlation between borrowing and consumption and then we conduct two counterfactual experiments.

Consistent with the collateral channel, cross-country empirical evidence shows that a distinguishing feature of the recent financial crisis (triggered by the sharp decline in house prices) is that countries with the largest increases in both their house prices and their ratios of household debt to income in the decade leading up to the crisis tended to experience the largest contractions in consumption during the subsequent recession (**Chart 3-A**). For instance, during the recession, consumption fell dramatically (by 6.7 per cent) in Ireland, the country that experienced the largest increases in household debt and house prices over the period from 1997 to 2007 (Glick and Lansing 2010). Among the countries in the sample, Canada's increase in household indebtedness was relatively low in the years leading up to the crisis and, as a consequence, Canadian households experienced only a slight decline in their consumption levels. Since that time, however, the Canadian household debt-to-income ratio and house prices have continued to rise.

Chart 3-A: Household indebtedness and the decline in consumption



Sources: Organisation for Economic Co-operation and Development, Eurostat and Statistics Canada, based on Glick and Lansing (2010)

Last observation: 2009Q1

In the first counterfactual experiment, we use the estimates presented in the article to undertake back-of-the-envelope calculations to assess the impact on consumption if home-equity extraction used to finance consumption in 2010 were to return to its level in 1999. This suggests that a house-price shock in 2010 that would have reduced the share of consumption financed by home-equity extraction back to its share in 1999 (i.e., a decline from 2.0 per cent to 0.7 per cent) would have reduced aggregate consumption in 2010 by about 1.3 per cent,

(*continued*)

Box 3 (*continued*)

ceteris paribus. If we use our alternative measure of consumption obtained by adding debt repayment to consumption, the decline in consumption would have been about 3.1 per cent.

In the second experiment, we use a dynamic general-equilibrium model in which house prices affect endogenously the value of collateral and, hence, the amount of household borrowing (Christensen 2011; Boivin, Lane and Meh 2010). This model features a collateral channel that works as follows: A fall in house prices decreases the value of the collateral held by households, leading to a deterioration in the state of household balance sheets. This deterioration decreases the amount that households can borrow for current consumption and for housing investment.[1] Simulation results suggest that a 10 per cent decline in house prices can generate a peak drop in consumption of about 1 per cent.

1 There is a feedback loop that may amplify the effects of the decrease in house prices on consumption. For further details, see Boivin, Lane and Meh (2010) and Christensen (2011).

Concluding Remarks

In this article, we have examined the relationship between the accumulation of household debt and spending on consumption and home renovation. We find that increases in home-secured debt, particularly home-equity extraction (increases in mortgage debt and draws on HELOCs on existing houses), contributed the largest share to the rise in total household debt in Canada between 1999 and 2010. Moreover, we show that a significant share of the funds borrowed against home equity was used for consumption and home renovation. These findings suggest that household indebtedness constitutes an important source of risk to household spending, since it makes households more vulnerable to substantial negative economic consequences in the event of a correction in house prices.

Although we have learned a great deal about the link between household borrowing and consumption and spending on home renovation, further work is needed to deepen our understanding of these issues. A future research question could focus on assessing how home-equity extraction in Canada responds to increases in house prices and identifying which types of households borrow more aggressively. In addition, further work is needed to show that countries with high ratios of household debt to income tend to experience simultaneously more severe and prolonged recessions, since it is difficult to reproduce supporting evidence using standard models.

Literature Cited

Boivin, J., T. Lane and C. Meh. 2010. "Should Monetary Policy Be Used to Counteract Financial Imbalances?" *Bank of Canada Review* (Summer): 23–36.

Buiter, W. H. 2010. "Housing Wealth Isn't Wealth." *Economics* 4 (22): 1–29. Available at <http://www.economics-ejournal.org>.

Campbell, J. Y. and J. F. Cocco. 2007. "How Do House Prices Affect Consumption? Evidence from Micro Data." *Journal of Monetary Economics* 54 (3): 591–621.

Carney, M. 2011a. "Growth in the Age of Deleveraging." Speech to the Empire Club of Canada and the Canadian Club of Toronto, Toronto, Ontario, 12 December.

——. 2011b. "Housing in Canada." Speech to the Vancouver Board of Trade, Vancouver, British Columbia, 15 June.

Christensen, I. 2011. "Mortgage Debt and Procyclicality in the Housing Market." *Bank of Canada Review* (Summer): 35–42.

Cooper, D. 2010. "Did Easy Credit Lead to Overspending? Home Equity Borrowing and Household Behavior in the Early 2000s." Federal Reserve Bank of Boston Public Policy Discussion Paper No. 09-7.

Côté, A. 2011. "Household Finances and Economic Growth." Speech to the Canadian Club of Kingston, Kingston, Ontario, 10 January.

Crawford, A. and U. Faruqui. 2011–12. "What Explains Trends in Household Debt in Canada?" *Bank of Canada Review* (this issue): 3–15.

Disney, R. and J. Gathergood. 2009. "Housing Wealth, Liquidity Constraints and Self-Employment." *Labour Economics* 16 (1): 79–88.

Gervais, M. 2002. "Housing Taxation and Capital Accumulation." *Journal of Monetary Economics* 49 (7): 1461–89.

Glick, R. and K. J. Lansing. 2010. "Global Household Leverage, House Prices, and Consumption." Federal Reserve Bank of San Francisco Economic Letter No. 2010-01.

Greenspan, A. and J. Kennedy. 2005. "Estimates of Home Mortgage Originations, Repayments, and Debt on One-to-Four-Family Residences." Board of Governors of the Federal Reserve System Finance and Economics Discussion Series Working Paper No. 2005-41.

——. 2007. "Sources and Uses of Equity Extracted from Homes." Board of Governors of the Federal Reserve System Finance and Economics Discussion Series Working Paper No. 2007-20.

Iacoviello, M. 2005. "House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle." *American Economic Review* 95 (3): 739–64.

Kartashova, K. "Home-Secured Debt of Canadian Households." Bank of Canada Working Paper (forthcoming).

Krusell, P. and A. A. Smith. 2003. "Consumption-Savings Decisions with Quasi-Geometric Discounting." *Econometrica* 71 (1): 365–75.

Laibson, D. 1997. "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics* 112 (2): 443–77.

Mian, A. and A. Sufi. 2011. "House Prices, Home Equity-Based Borrowing, and the U.S. Household Leverage Crisis." *American Economic Review* 101 (5): 2132–56.

Peterson, B. and Y. Zheng. 2011–12. "Medium-Term Fluctuations in Canadian House Prices." *Bank of Canada Review* (this issue): 30–42.

Sinai, T. and N. S. Souleles. 2005. "Owner-Occupied Housing as a Hedge Against Rent Risk." Federal Reserve Bank of Philadelphia Working Paper No. 05-10.

Medium-Term Fluctuations in Canadian House Prices

Brian Peterson, Financial Stability Department, and Yi Zheng, Canadian Economic Analysis Department

- House prices in Canada have experienced a steady annual increase for more than a decade. Understanding the key factors behind this price rise is important for assessing the implications for future growth in output and inflation and the risks to financial stability.
- In Canada, as in other countries, movements in land and house prices over long time horizons are driven primarily by changes in population and per capita income. Over shorter horizons—a decade or less—house prices may outpace population and income in some periods and lag behind them in others.
- This article explores the key factors behind these "medium-run" fluctuations in house prices that emerge when one views housing as both a consumer durable and an asset. The analysis presented here suggests that interest rates, expected movements in future prices and changing liquidity in the housing market all play a role in the determination of house prices, especially over the medium term.

After more than 10 years of appreciation in many parts of the country, house prices have reached a historically high level relative to income and, given the increase in household indebtedness, the exposure of households and the financial system to fluctuations in house prices has increased markedly.[1] Understanding the key factors underlying the increases in house prices is important for assessing the implications of these price movements for future growth in output and inflation and the risks to the stability of the financial system.

To understand developments in house prices, we need to recognize the dual nature of housing both as a durable consumption good and as an asset.[2] As is the case for other consumer durables, housing provides a stream of services (i.e., shelter) over an extended period of time. Thus, the *long-run* trend in house prices should be determined by fundamental factors of supply and demand. In the *short* to *medium run*, however, housing supply adjusts slowly to changes in demand, potentially leading to larger price swings than would be expected in the long run. Since a house is a large purchase that often requires a substantial amount of financing, interest rates and credit conditions can affect house prices. In addition, a house is also an important asset for many households, so factors such as expected capital gains or the liquidity of the housing market can further influence house prices. Adding the asset

1 See Crawford and Faruqui (this issue).

2 Poterba (1984) is one of the first papers to augment a consumption-based model of housing with features of an asset market.

elements to a standard model of housing as a consumer durable can improve our understanding of house-price dynamics, particularly over the medium run.

This article draws on theory and empirical evidence to examine a number of factors that help to explain movements in Canadian house prices. An overview of the changes in regional house prices in Canada over the past 30 years shows that growth in both income and population can largely explain the rising trend in house prices over this period. These factors alone, however, cannot account for the fluctuations around the long-run trend over shorter horizons. The bulk of the article investigates the determinants of these medium-run movements. Our research indicates that approaches incorporating effective mortgage rates, house-price expectations and the liquidity of the housing market are needed to understand the behaviour of house prices, especially over the medium term. The work described here represents substantial progress toward a better understanding of movements in house prices in Canada, but more research would be helpful. Important areas for future work are discussed in the concluding section.

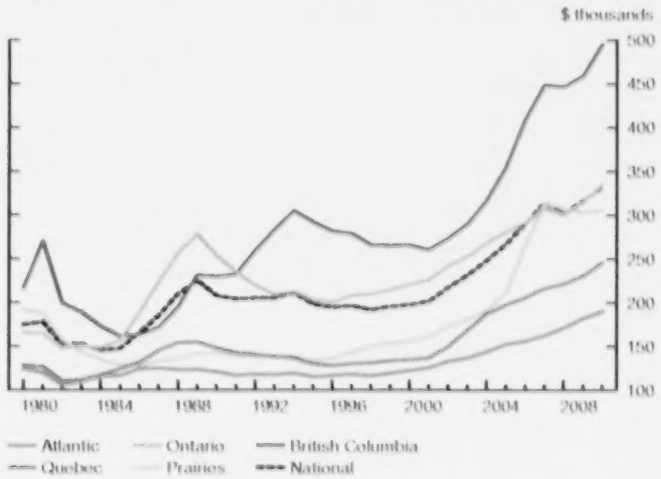
Long-Run Movements in Canadian House Prices: An Overview

House prices have differed substantially across regions and tend to increase over the long run

Three observations can be made regarding the behaviour of real house prices in Canada's resale market since 1980 (**Chart 1**).[3, 4] First, house prices have differed substantially across regions and have, for most of the period, been higher in British Columbia and Ontario than elsewhere in Canada. Second, real house prices tend to increase over the long run, with an average cumulative gain of 88 per cent across regions since 1980, although growth varied from 54 per cent in Atlantic Canada to 130 per cent in British Columbia. Third, in addition to upward trends, there are also shorter periods of expansion and contraction in house prices, and these price movements

Chart 1: **Average real resale house prices in Canada**

Annual, by region, deflated by consumer price index, rebased to 2010



Sources: Canadian Real Estate Association and Statistics Canada — Last observation: 2010

3 Besides regional variations in housing markets, there are also significant differences among cities within the same province or region.

4 Though the data used for much of the analysis presented here are on existing homes (resales), this article is relevant for prices of both new and existing homes.

are often common across regions. Examples include the period of rapid price growth in the late 1980s and in the past decade, and the period of slow price growth in the 1990s.

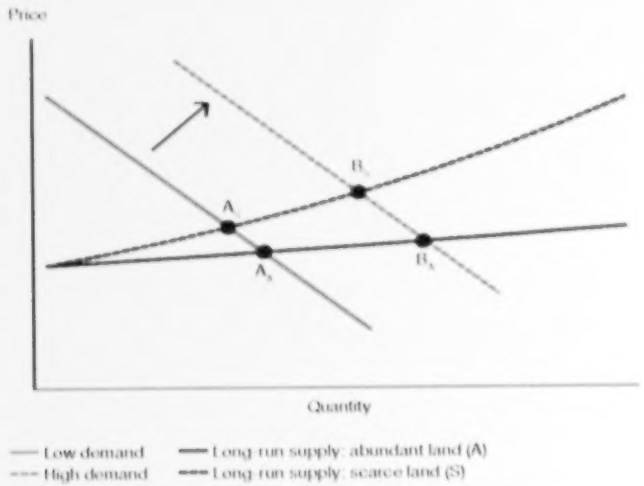
Long-run movements in house prices

In a standard model that treats housing as a consumer durable, movements in prices over long time horizons are determined by supply of and demand for housing (Capozza and Helsley 1989; Mayer and Somerville 2000; Smith 1969a, 1969b). Growth in both population and per capita income leads to permanently higher demand for housing, in terms of quantity and quality.[5, 6] The resulting increase in house prices would be greater in areas where land is scarce (A_S to B_S in **Figure 1**), than in areas where land is more abundant (A_A to B_A).[7]

The trend rise in Canadian house prices is associated with growing population and income

To illustrate the explanatory power of the long-run factors, **Chart 2** depicts the ratios of house prices to provincial gross domestic product (GDP), which is primarily influenced by both per capita income and population, for five regions in Canada.[8] Given that these ratios show no trend over the 30-year sample period, one could conclude that the trend rise in Canadian house prices observed in **Chart 1** is indeed associated with growing population and

Figure 1: **Supply and demand curves for scarce and abundant land**



5 The discussion in this section uses the Canadian Real Estate Association Multiple Listing Service (MLS) resale price, which does not adjust for changes in housing quality. While this is clearly a shortcoming, it is the only measure of house prices with a long history and wide geographical coverage. Other analyses in this article use different measures. See **Appendix 1** on page 40 for a discussion of measures of house prices in Canada.

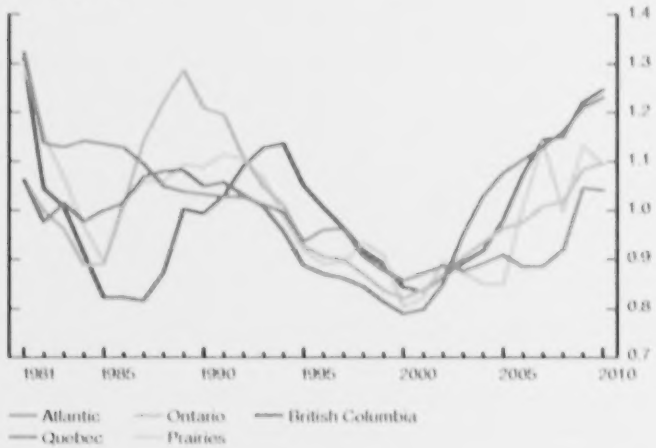
6 In theory, the age composition of the population could also influence house prices, as a larger proportion of individuals at the age when they would form a household would imply a higher demand for housing. In practice, however, econometric studies have not found a robust relationship between age composition and house prices. The declining proportion of the youth population (ages 25 to 39) since the turn of the millennium in many developed economies, including Canada, certainly cannot explain rising house prices over the same period.

7 A housing unit is made up of a structure and land. In the long run, the supply of structures, relative to the supply of residential land, is assumed to be more elastic because the construction industry can more easily adjust its capacity over this horizon in response to price movements. Therefore, the slope of the long-run supply curve of housing is primarily determined by the scarcity of land.

8 Disposable income would be a more relevant measure of income for this purpose, but data are not available on a provincial basis. In national data, the ratio of house prices to GDP tracks the ratio of house prices to disposable income very closely, but the differences between these measures could be more important at the regional level. Note that the ratio of house prices to per capita GDP does have a rising trend, which is consistent with the idea that land is becoming more scarce over time.

Chart 2: **House prices relative to provincial gross domestic product**

Ratio of nominal Multiple Listing Service resale house prices to nominal GDP, annual, average per region = 1



Sources: Canadian Real Estate Association and Statistics Canada — Last observation: 2010

income, which has increased demand, coupled with an upward-sloping long-run supply curve owing to the increasing scarcity of land for residential development, primarily in urban areas.[9]

Movements in House Prices over the Medium Run

The remainder of the article focuses on explaining medium-run movements in house prices, considering housing both as a consumer durable and as an asset. **Chart 2** shows that movements in resale house prices over a horizon of a decade or less can be large, sometimes rising or falling by 30 per cent relative to GDP. These medium-run movements also appear to be correlated across Canada, especially after 1995. This suggests that, even though housing markets are considered to be local, similarities can be observed across regions, reflecting the influence of common national or global factors.[10] The research discussed below uses both aggregate and regional analysis to highlight some of these common factors.

The following two subsections concentrate on housing primarily as a consumer durable. The first discusses theory and the second empirical work that incorporates the effects of interest rates. The consumer-durable approach explains much, but not all, of the movements in house prices. In the final two subsections, we add the additional element that housing is also an asset and show that user cost and liquidity can contribute to medium-run movements in house prices.

Housing as a consumer durable over the medium run

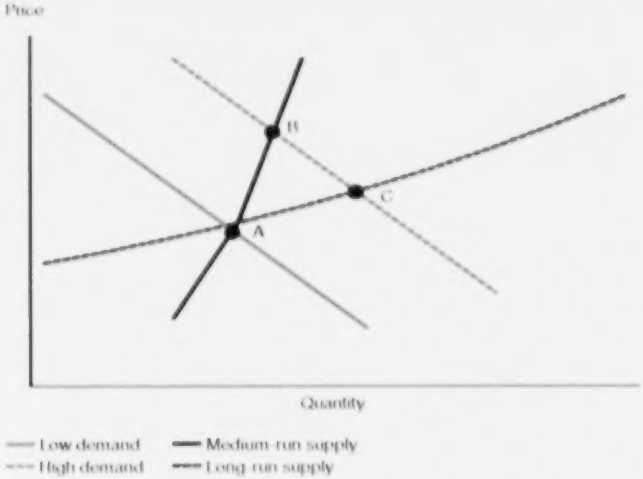
Over the medium run, the supply of housing adjusts slowly

Over the medium run, the standard consumption-based model of housing assumes that the supply of housing adjusts slowly, because of the time and planning required for the construction industry to adjust its capacity and to

9 Davis and Heathcote (2007) estimate that most of the movements in house prices in the United States can be attributed to changes in the value of land, not structures. While data limitations prevent us from conducting a similar exercise, the same conclusion probably applies in Canada.

10 After controlling for population and income, we find evidence that regional house prices move together in the long run, particularly after the mid-1990s. In contrast, Allen et al. (2009) find no evidence of a similar long-run relationship across city house prices over a shorter sample period.

Figure 2: **Supply and demand in the medium run and long run**



bring new housing developments to market. This implies that the medium-run supply curve is steeper than the long-run supply curve (**Figure 2**). In the medium run, an increase in demand causes prices to increase (moving the equilibrium in the housing market from point A to point B in **Figure 2**). Over time, supply responds and house prices adjust downward to a new long-run equilibrium (point C).[11]

Housing demand can be influenced by changes in interest rates and overall credit conditions

Housing demand might rise owing to the long-run fundamentals of per capita income and population, but it may also increase for other reasons. At shorter horizons, for example, housing demand[12] can be influenced by changes in interest rates and overall credit conditions.[13] As a result, the medium-run increase in prices may be larger than the long-run increase because of the slow adjustment of supply and other factors that may temporarily boost demand.

Interest rates

Taking into account the differences in house-price dynamics over the long and medium run, Zheng (forthcoming) uses an error-correction model that permits the estimation of a long-run relationship between house prices and various underlying factors and also captures the adjustment of prices back to the long-run level when certain factors cause them to rise or fall temporarily. One finding is that deviations of house prices from the long-run trend take about six years to adjust. This model also provides estimates of the effects of real effective mortgage rates[14] on Canadian house prices, after

11 The downward price adjustment need not be a fall in real or nominal house prices; the adjustment may occur during a period of slow growth in house prices relative to fundamentals such as population or income.

12 As argued in Smith (1969a), changes in interest rates and credit market conditions can influence the demand for owner-occupied housing, whereas growth in population and income affects the overall demand for housing, including rental housing.

13 In our later discussion of housing as an asset, we note that demand could also be influenced by expectations of growing house prices (see "User costs and price expectations" on page 35). Theoretically, however, expectations of future prices should affect the price-to-rent ratio, so rents could adjust rather than prices.

14 The measure of the real effective mortgage rate incorporates discounts and allows a changing mix between fixed- and variable-rate mortgages over time. This is conceptually equivalent to the effective mortgage rate used for calculating the affordability index in the *Financial System Review* published by the Bank of Canada.

controlling for real disposable income per household and population.[15, 16] The results imply that, of a cumulative increase of 45 percentage points in real house prices between the fourth quarter of 2001 and the third quarter of 2010 (the most recent episode of steady growth in house prices), increasing population accounts for up to 15 percentage points, followed by rising real household disposable income at 11 percentage points, and declining real effective mortgage rates at 6 percentage points.[17] While the remaining 13 percentage points can be partly attributed to a recovery from the sluggish price growth of the 1990s, other factors may exert an influence on medium-run movements in house prices.

In the next two sections, we examine the role of price expectations and market liquidity in generating medium-run movements in house prices.

User costs and price expectations

The analysis so far has considered housing primarily as a consumer durable. To understand house-price dynamics more fully, it is useful to expand our approach and consider housing as an asset as well. We first describe the user-cost approach.

This approach considers a homeowner's willingness to buy a house rather than rent, which depends on a comparison of the costs and benefits associated with these two options for housing. Homeowners avoid paying rent, but incur maintenance costs, opportunity costs (since they give up interest income from an alternative safe investment, such as government bonds) and face a risk premium stemming from the uncertainty of the return on the investment when the house is eventually sold.[18] Meanwhile, these costs of home ownership would be reduced by the amount of appreciation the household expects from its investment. Intuitively, if prices are expected to rise because of a belief in a future improvement in fundamentals, a household should be more willing to own rather than rent, causing prices to rise relative to rents.[19] More formally, rent should equal the user cost of a house, given by:[20]

$$\textit{User cost} = \textit{House price} \times (\textit{maintenance cost} + \textit{opportunity cost} + \textit{risk premium} - \textit{expected price appreciation}). \quad (1)$$

15 The dependent variable is the Teranet–National Bank National Composite House Price Index extended backwards, using data from Royal LePage and MLS, deflated by the consumer price index.

16 Alternative specifications, including proxies for construction costs and financial innovations, are also tested, but prove unsatisfactory, in part, because of a lack of consistently defined data covering a sufficient length of time for these variables. Supply-side data are limited, as discussed by Dupuis and Zheng (2010).

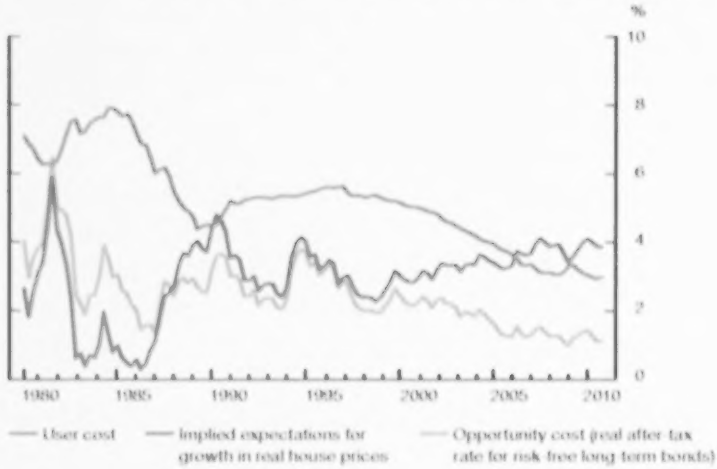
17 Falling real interest rates have been a global phenomenon over the past couple of decades. More broadly, prior to the recent financial crisis, access to credit in many economies had become easier, owing to financial innovation and a large supply of capital from the global savings glut (Carney 2011). This easing of global credit conditions before the crisis likely contributed to the significant and widespread increases in house prices that many advanced countries experienced over this period (IMF 2008).

18 Alternatively, a mortgage rate could be used instead of a government bond rate when financing is involved in the purchase.

19 For a complete model, see Poterba (1984).

20 For simplicity, we assume that rental housing and owner-occupied housing offer comparable services. Hence, the market rent would be equivalent to the imputed rent for owners. More realistically, the quality of service offered by rental housing is likely lower than that offered by owner-occupied housing. This, combined with the existence of rent control in some parts of Canada, means that market rent is actually lower than imputed rent for owners. Nevertheless, as long as the difference between the two remains stable, the time-series property of the user-cost measure calculated using the market rent is not materially affected.

Chart 3: **User cost of capital, expectation of price growth and opportunity cost**



Source: Authors' calculations

Last observation: 2010Q4

With data on rents, house prices and the real after-tax yield on long-term government bonds (as a proxy for opportunity cost), and the assumption that the maintenance cost and risk premium stay constant at slightly under 6 per cent, equation 1 allows us to calculate the implied expectations for growth in real house prices.[21] This is shown in **Chart 3**, along with the user cost (expressed as a percentage of the house price) and the opportunity cost. In Canada, two distinct episodes of declines in the user cost of capital over the past three decades can be identified, each associated with a period of appreciating house prices. In the first episode (the second half of the 1980s), the user cost fell sharply, despite an increase in real long-term interest rates. In the user-cost model, this is interpreted as reflecting a rise in expectations about the growth of house prices. The current episode, which began around 2000, has occurred at a more moderate pace, but has lasted twice as long. The model suggests that both the falling real interest rates and the expectations for rising house prices have contributed to the reduction in the user cost of capital during the current episode. This confirms the association between declining long-term interest rates and an increase in housing demand, but also suggests that expectations of future price increases could help to explain the recent rise in house prices.[22]

Expectations of future price increases could help to explain the recent rise in house prices

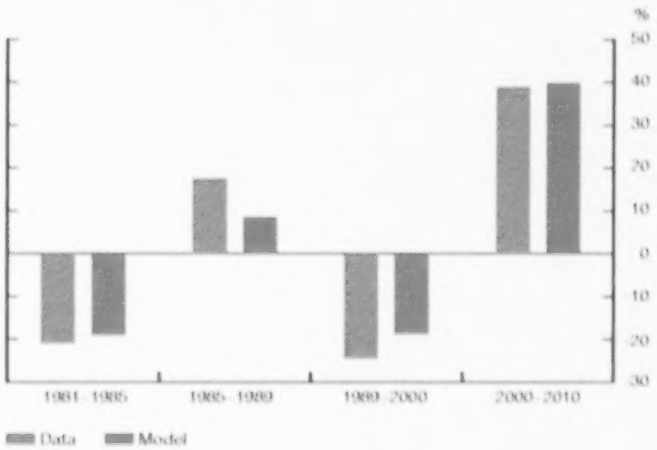
Market liquidity

As shown in **Chart 2**, there are medium-run movements in regional house prices that are not explained by provincial GDP (which incorporates the long-run factors of population and income). These movements are cyclical, and cumulative increases and decreases in prices relative to GDP are approximately 20 to 30 per cent (**Chart 4**, the red bars representing data). The two previous subsections focused on the national level to argue that these medium-run movements in house prices were partly attributable to changes in economy-wide interest rates and to changes in expectations of future house-price growth. In this final subsection, we focus on the regional level

21 Specifically, we assume a maintenance cost (including property taxes) of 2.7 per cent, and a risk premium of 3 per cent. The risk premium is estimated over the 30-year sample period using the consumption-based capital-asset-pricing model (Galtner 1989).

22 It would be desirable to enhance the error-correction model mentioned earlier with a direct measure of house-price expectations (such as those derived from surveys), but this is prevented by data limitations.

Chart 4: **Cumulative increase in prices relative to gross domestic product, averaged across regions**



Sources: Canadian Real Estate Association and Statistics Canada (data), Bank of Canada calculations (model)

Last observation: 2010

and introduce an alternative, albeit complementary, approach that focuses on the role of the changing liquidity of housing. An empirical link between liquidity in the housing market and medium-run movements in house prices is present in all regions, although changes in liquidity in each region may differ in size and when they occur. For the purposes of exhibition, however, we aggregate the results across regions or show national results.

Similar to user cost, liquidity is a property of an asset, reflecting the ease with which an asset can be bought and sold. There are several ways to measure liquidity in the housing market. Good indicators are the time it takes for a house to sell, the vacancy rate of owner-occupied houses or a measure of sales to available supply, such as houses listed for sale. However, data limitations can make it difficult to construct consistent measures of these indicators for a sufficient length of time to perform empirical analysis. As an alternative, researchers often use a measure of turnover, defined as the ratio of sales to the existing stock of houses, which captures the volume of transactions in the housing market. The factors that affect demand, such as interest rates, income growth, population growth, credit conditions and price expectations, can all influence liquidity.[23]

Beginning with Stein (1995), there is a well-documented relationship between growth in real house prices and turnover.[24] Peterson (forthcoming) documents such a relationship in Canada at both the regional and national levels (see **Chart 5** for the national relationship). Changes in turnover capture all of the cyclical periods of high and low growth in real house prices. Peterson (2012) shows similar evidence for the United States.

What can generate the relationship between turnover and prices? Peterson (2012) offers an approach based on the liquidity of a house.[25] This model

23 Supply can also have an impact on liquidity, affecting prices. See Peterson (2012).

24 England (2011) has an overview of the evidence.

25 A complementary approach is the work by Stein (1995) and Ortalo-Magné and Rady (2006), which relies on the observation that most housing is purchased with a mortgage. An increase in income of young households could raise the demand for starter homes among credit-constrained first-time homebuyers. The resulting increase in house prices could raise the equity of current homeowners so that they can afford to buy a larger house. This raises the demand for housing further, increasing turnover and boosting prices.

Chart 5: **Growth in real house prices and turnover**

Sources: Canadian Real Estate Association and Statistics Canada — Last observation: 2010

accounts for the key features of housing markets: individual houses may be very different, prices are typically determined through negotiation between a buyer and seller, and only a subset of the housing stock is bought and sold in a given year. In this approach, demand drives liquidity, which is measured by turnover. When demand is high and there are many buyers relative to sellers, buyers may raise their offer (or bidding price). Therefore, a temporary increase in demand would raise house prices above the long-run trend by raising the liquidity of a house. Over time, as the market cools, the liquidity of a house would fall back to normal, and prices would revert to the long-run trend. As long as demand remains high,[26] however, new entrants to the market may not realize that the prices of houses previously sold were bid up, because housing was more liquid. If current buyers and sellers use *comparables*[27] to price houses, a persistent increase in demand will lead buyers to continue to bid prices up, escalating price rises even further.[28] During a downturn, the effect works in reverse, depressing house prices, with sellers accepting a discount relative to past sales because of a decrease in the liquidity of a house.

Cyclical changes to the liquidity of a house can explain medium-run movements in house prices

Using this liquidity approach, Peterson (forthcoming) estimates medium-run movements in Canadian house prices that can be attributed to changes in turnover at the regional level. Such an approach can explain medium-run movements in prices that are not influenced by GDP (**Chart 4**, the blue bars representing the model). This suggests that cyclical changes to the liquidity of a house can explain medium-run movements in house prices that are not determined by long-run fundamentals such as population and income.[29]

26 Demand could remain high for several reasons. The mechanism mentioned by Stein (1995) is one example. Alternatively, Shiller (2005) argues that an increase in prices raises expectations of future price increases, creating a feedback loop and raising future demand. These effects can also generate momentum in house prices where an above-trend increase in house prices in one year leads to above-trend increases in subsequent years.

27 Comparables are houses that have recently been sold and have similar characteristics to a house that buyers and sellers are bargaining over.

28 Peterson (2012) estimates that this effect accounts for over 70 per cent of the above-trend growth in house prices in the United States from 1995 to 2006.

29 Peterson (forthcoming) also finds that house price momentum and reversion to fundamentals are almost entirely captured by movements in turnover.

However, in order to fully understand medium-run movements in house prices, the reasons for cyclical movements in housing liquidity need to be better understood.

Concluding Remarks

This article has argued that income and population are important determinants of Canadian house prices over the longer term and can help explain much of the increase in house prices over the past decade. Other factors are at work, however. Research at the Bank of Canada and elsewhere indicates that a combination of declining long-term effective mortgage rates, expectations of rising future house prices and changes in the liquidity of the housing market have also contributed to the gains in house prices in the past decade. Over history, these other factors are associated with the medium-run tendency of house prices to rise faster than their long-run trend for a number of years and then subsequently adjust back to trend.

The Bank of Canada conducts ongoing research and analysis to better understand the movement and determinants of house prices. Future research should seek to develop models that better incorporate the dual nature of housing as both a durable consumption good and an asset, particularly the links between credit market conditions, interest rates, leverage and housing demand.[30] It would also be worthwhile to explore how expectations of house prices are formed. Finally, to enhance the research, more comprehensive data are needed on house prices, construction costs, land values, credit conditions and house-price expectations.

30 Recent work at the Bank of Canada has focused on this area. See Christensen et al. (2009).

Appendix 1

Indicators of House Prices in Canada

A prerequisite for a better understanding of the housing market is a well-constructed indicator of house prices. There are three main criteria for a "useful" index of house prices. It should: (i) measure constant quality, (ii) represent a range of properties across regions and (iii) cover a sufficiently long time span. The first criterion states that an indicator of house prices should track price changes not due to quality improvements. The second criterion requires that the subset of properties forming the basis of the indicator represent the universe of properties in terms of structural and geographical coverage. The third criterion calls for time-series data that span multiple market cycles in order to differentiate between trend and cyclical movements in prices. None of the commonly used indicators of house prices in Canada meets all three criteria. **Table A-1** summarizes the key features of these indicators. Most of the national analysis in this article is based on the Teranet–National Bank National Composite House Price Index.[1] The Canadian Real Estate Association Multiple Listing Service (MLS) average home price is used for regional analysis or when a longer historical perspective is required.

1 In addition to the indicators that we have listed in Table A-1, the Canadian Real Estate Association recently released a constant-quality index of house prices (the MLS House Price Index) dating back to 2005.

Table A-1: Key features of five indicators of house prices

Indicator	Statistics Canada New Housing Price Index (NHPI)	Statistics Canada Apartment Building Construction Price Index	Canadian Real Estate Association MLS average home price	Teranet–National Bank National Composite House Price Index	National Accounts implicit price index for residential structures
Price value or index	index	index	value	index	index
Constant quality?	partial	partial	no	yes	partial
Frequency	monthly	quarterly	monthly	monthly	quarterly
First value	January 1981	1988Q1	January 1980	February 1999	1961Q1
Publication lag	1.5 months	1.5 months following end of quarter	2 weeks	2 months	2 months
Source of data	building contractors	building contractors	real estate boards	provincial land registries	various
Structure coverage	single, semi-detached, row unit, other (but mainly single)	apartment building	single, semi-detached, row unit, apartment, other	single, semi-detached, row unit, condominium	new construction (of all structural types), renovation and ownership transfer costs
Structure-specific indicator available?	no	yes	no	no	no
Geographical coverage	21 metropolitan areas	7 metropolitan areas	25 metropolitan areas, 10 provinces	11 metropolitan areas	Canada
Methodology	chain Laspeyres index, weighted by building completion of the previous 3 years, valued at 1997 prices among the regions; average model price within region	chain Laspeyres index, weighted by building permits of the previous 3 years, valued at the fourth quarter of the last year among the regions; fixed weighted among trade groups within region	simple average/ median price of properties sold via the MLS; a weighted (yet unpublished) version of the national average takes into account provincial proportions of units of privately owned housing stock as reported in the 2006 Census	repeat-sales index (June 2005 = 100) for each region similar to the Case-Shiller Home Price Index in the United States; national average is weighted using the value of housing stock in the 2006 Census	derived indirectly as the ratio of the nominal to real value of residential investment, with each component of the real value deflated separately using a number of price indexes, including the NHPI, the Industrial Product Price Index, wage rates and the MLS average prices
Seasonal adjustment?	no	no	yes	no	yes
Revisions?	no	yes	yes	yes	yes

Literature Cited

Allen, J., R. Amano, D. P. Byrne and A. W. Gregory. 2009. "Canadian City Housing Prices and Urban Market Segmentation." *Canadian Journal of Economics* 42 (3): 1132–49.

Capozza, D. R. and R. W. Helsley. 1989. "The Fundamentals of Land Prices and Urban Growth." *Journal of Urban Economics* 26 (3): 295–306.

Carney, M. 2011. "Growth in the Age of Deleveraging." Speech to the Empire Club of Canada and the Canadian Club of Toronto, Toronto, Ontario, 12 December.

Christensen, I., P. Corrigan, C. Mendicino and S.-I. Nishiyama. 2009. "Consumption, Housing Collateral, and the Canadian Business Cycle." Bank of Canada Working Paper No. 2009-26.

Crawford, A. and U. Faruqui. 2011–12. "What Explains Trends in Household Debt in Canada?" *Bank of Canada Review* (this issue): 3–15.

Davis, M. A. and J. Heathcote. 2007. "The Price and Quantity of Residential Land in the United States." *Journal of Monetary Economics* 54 (8): 2595–620.

Dupuis, D. and Y. Zheng. 2010. "A Model of Housing Stock for Canada." Bank of Canada Working Paper No. 2010-19.

Englund, P. 2011. "Swedish House Prices in an International Perspective." Chapter I.1 in *The Riksbank's Inquiry into the Risks in the Housing Market*, 23–66. Stockholm: Sveriges Riksbank.

Geltner, D. 1989. "Estimating Real Estate's Systematic Risk from Aggregate Level Appraisal-Based Returns." *Real Estate Economics* 17 (4): 463–81.

International Monetary Fund (IMF). 2008. "The Changing Housing Cycle and the Implications for Monetary Policy." Chapter 3 in *World Economic Outlook* (April).

Mayer, C. J. and C. T. Somerville. 2000. "Residential Construction: Using the Urban Growth Model to Estimate Housing Supply." *Journal of Urban Economics* 48 (1): 85–109.

Ortalo-Magné, F. and S. Rady. 2006. "Housing Market Dynamics: On the Contribution of Income Shocks and Credit Constraints." *Review of Economic Studies* 73 (2): 459–85.

Peterson, B. 2012. "Fooled by Search: Housing Prices, Turnover and Bubbles." Bank of Canada Working Paper No. 2012-3.

Peterson, B. "The Canadian Housing Market: Turnover and Prices." Bank of Canada Working Paper (forthcoming).

Poterba, J. M. 1984. "Tax Subsidies to Owner-Occupied Housing: An Asset-Market Approach." *Quarterly Journal of Economics* 99 (4): 729–52.

Shiller, R. J. 2005. *Irrational Exuberance*, 2nd ed. Princeton: Princeton University Press.

Smith, L. B. 1969a. "A Bi-Sectoral Housing Market Model." *Canadian Journal of Economics* 2 (4): 557–69.

——. 1969b. "A Model of the Canadian Housing and Mortgage Markets." *Journal of Political Economy* 77 (5): 795–816.

Stein, J. C. 1995. "Prices and Trading Volume in the Housing Market: A Model with Down-Payment Effects." *Quarterly Journal of Economics* 110 (2): 379–406.

Zheng, Y. "A Model of House Prices for Canada." Bank of Canada Discussion Paper (forthcoming).

Household Insolvency in Canada

Jason Allen and Evren Damar, Financial Stability Department

- Since 1999, the level of indebtedness of Canadian households has increased from 110 per cent to 150 per cent of personal disposable income, making them more vulnerable to shocks that will lead to insolvency. There may be significant implications for the financial system if a systemic shock leads to reduced access to credit.
- There are two types of insolvency: bankruptcy, where all unsecured debt is written off, and debt restructuring. The largest unsecured liabilities are credit card debt and bank loans.
- Drawing on an administrative database of all bankruptcy filings in Canada, this article documents substantial variation in bankruptcy rates over time and across neighbourhoods to better understand the factors that contribute to a rise in household insolvency.
- A potential explanation for the observed patterns in bankruptcy rates across different neighbourhoods is the presence of bank branches and the relationship between creditors and debtors at the local level.

Since 2000, approximately 100,000 Canadians have filed for insolvency each year. This comprises mostly bankruptcies and is triple the annual number of bankruptcies in the 1980s. With increasing levels of household debt in recent years, the number of households that may be vulnerable to a negative economic shock is rising as well. As highlighted in the December 2011 issue of the Bank of Canada's *Financial System Review*, deterioration in the credit quality of household loans and the growing vulnerability of the household sector to adverse economic shocks are the main domestic sources of risk to financial stability.

Recent experiences in the United States and in many European countries have illustrated the importance of assessing the financial situation of households, since fragility in the household sector can have substantial adverse spillovers to the financial system and the entire economy. Meh et al. (2009), for example, using data from a sample of Canadian households between 1999 and 2005, find that as debt-to-income and debt-to-asset ratios increase, households become more sensitive to movements in interest rates, negative income shocks and changes in the housing market. The authors also provide some evidence that less-affluent households have higher debt burdens relative to income and, therefore, that this segment should be monitored and studied more closely.

Insolvency indicates acute stresses in the financial stability of households and also, potentially, of the financial sector. Households that have recently

filed for insolvency have reduced access to unsecured credit and accumulate less wealth than households that have never filed for insolvency, as demonstrated by Han and Li (2011). Insolvent households may also consume less.[1] In addition to these factors on the demand side, there are important supply-side effects of higher insolvency rates. Financial institutions that lend to households may be affected by a higher number of charge-offs and may reduce access to credit for borrowers and tighten lending standards. Financial institutions might also choose to lend at higher rates, which may lead to more instances of insolvency. All of these effects can exacerbate an economic downturn.

This article provides a brief overview of the data on insolvencies, focusing on some stylized facts about insolvent individuals in Canada between 1998 and 2009. This is followed by a review of key research currently being done at the Bank of Canada and elsewhere that is designed to improve our understanding of the role played by financial institutions in insolvency filings in Canada.

Characteristics of Insolvent Households

In Canada, consumer insolvencies are governed by the Bankruptcy and Insolvency Act (BIA). The BIA requires that all insolvency filings be reported to the Office of the Superintendent of Bankruptcy Canada (OSB), which collects and manages data used by many organizations to analyze the overall vulnerability of Canadian households. This data set includes administrative information on individuals, such as income and employment status, from 1998 to 2009.[2] We draw on these data, as well as data from Statistics Canada, to report a number of key stylized facts about insolvency in Canada.

Canadians have two options when they become insolvent. First, they can file for bankruptcy, where they liquidate their assets, their unsecured debt is written off and any wage garnishments in place are stayed (i.e., suspended). Filing for bankruptcy does not protect individuals from secured creditors, however; for example, they must continue to make their mortgage payments (**Box 1** provides more information on the bankruptcy process). A second option is to file a proposal for debt restructuring (referred to as a "Consumer" or "Division II" proposal). If the proposal is approved by a majority of the creditors, debt agreements are restructured to allow repayment on different terms than those in the original contracts. A debt-restructuring proposal may be preferable to bankruptcy for all parties, since the unsecured creditor avoids a total writeoff of the debt, and the individual is able to continue his or her normal activities as before,[3] but with easier repayment terms.

Canadians have two options when they become insolvent. They can file for bankruptcy, [or they can] file a proposal for debt restructuring

The percentage of Canadians who opt for debt restructuring has been rising in recent years (**Chart 1**). Before September 2009, when changes to the BIA took effect, individuals could file for restructuring only if their total debt, excluding debt secured by their primary residence, did not exceed $75,000. After September 2009, that amount increased to $250,000; hence, many

1 Filing for insolvency can have two opposing effects on a household's consumption. Relieving the debt burden allows more of the household's income to be directed toward consumption. At the same time, the household will pay higher interest rates on any unsecured debt (such as credit cards), which can reduce consumption. The overall impact will depend on which of the two effects dominates (Chatterjee et al. 2007).

2 The amount of detail varies by year, but recently there has been more information available on individuals. For earlier years, information is available only on total assets and total liabilities, while for later years, information includes a detailed breakdown of assets and liabilities.

3 An individual filing for debt restructuring may, however, have some difficulty accessing the credit market. A debt restructuring remains on an individual's credit history for three years, while a bankruptcy filing remains on an individual's credit history for six to seven years.

Box 1

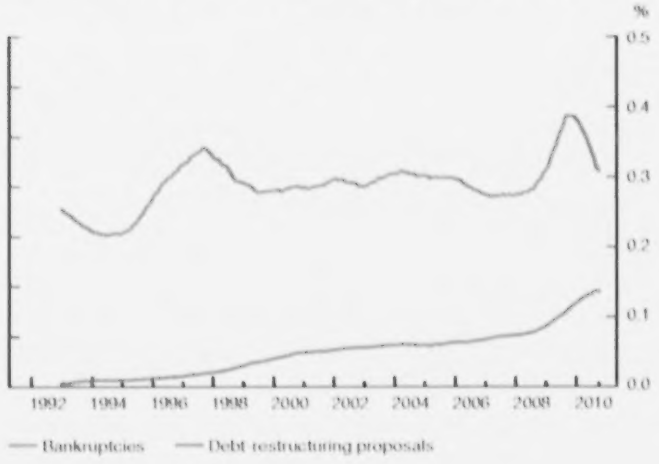
The Bankruptcy Process in Canada

If an individual decides to file for bankruptcy, he or she is required to work with a bankruptcy trustee. In Canada, trustees are private intermediaries who, for a fee, assist individuals in completing the required paperwork and file it with the Office of the Superintendent of Bankruptcy Canada (OSB). Once the individual is declared to be bankrupt by the OSB, the trustee deals directly with the individual's creditors. The trustee is also in charge of selling the individual's assets and determining how many payments he or she has to make to the trustee while in bankruptcy. For more details on both debt-restructuring and bankruptcy procedures, see Sarra (2008).

First-time filers who fulfill all bankruptcy requirements (including financial counselling) are automatically discharged after nine months and can make a "fresh start." Some of a filer's financial obligations, such as child-support or court-ordered payments, remain during bankruptcy and are not discharged after the bankruptcy period is over; the filer must continue to meet those obligations. Student-loan debts are discharged only if the filer has been out of school for a long time period (10 years during our sample period, decreased to 7 years in September 2009). The remaining filers obtain a recommendation from their trustees and attend a discharge hearing, where they may be given full discharge or a "conditional discharge," meaning that they are out of bankruptcy but have to continue making payments to the trustee. When making his or her recommendation to the bankruptcy court, the trustee is required to consider factors such as the total payments the individual has made and the fact that the individual chose bankruptcy over a debt-restructuring proposal. This procedure is equivalent to a Chapter 7 bankruptcy filing in the United States (Livshits, MacGee and Tertilt 2007).

Chart 1: **Bankruptcies and debt-restructuring proposals in Canada, 12-month moving average**

As a proportion of the population aged 20 and over, per 1,000 persons



Sources: Statistics Canada and the Office of the Superintendent of Bankruptcy Canada

Last observation: October 2010

more households are now eligible to file for restructuring. This suggests that the 2009 changes to the BIA could have played an important role in the subsequent increase in debt restructuring. Research by Li, White and Zhu (2011) supports this hypothesis. They show that changes to U.S. bankruptcy regulations have had a clear impact on (i) the choice to declare insolvency and (ii) whether to file for bankruptcy or debt restructuring, especially for households with mortgage debt. Since the vast majority of the filings in our sample took place before the law was amended, however, determining the impact of regulatory changes on insolvency patterns is beyond the scope of this article.

Average debt

The total debt reported by most individuals who filed for insolvency between 2007 and 2009 is actually below the $250,000 threshold for debt restructuring (**Table 1**). The average owed by an individual filing for bankruptcy was just over $92,000, while the average owed by an individual filing for restructuring was approximately $115,000. Given that the average debt per household in Canada was approximately $56,700 ($79,368 for homeowners and $10,420 for renters)[4] during the same period, it is evident that the amount of debt held by those filing for insolvency is substantial. This high level is surprising, since a large percentage of individuals who file for bankruptcy are renters and, therefore, do not have a mortgage.[5]

Table 1: Total debt of those who filed for insolvency, 2007–09
In Canadian dollars

	Mean	Standard deviation	10th percentile	50th percentile	90th percentile
Bankruptcy	92,528	463,596	12,237	39,446	219,227
Debt restructuring	114,729	246,570	14,419	53,791	280,373

Note: This information is available for 97 per cent of filers between 2007 and 2009.
Source: Office of the Superintendent of Bankruptcy Canada

Household income

Many individuals who file for bankruptcy have little to no income from employment or other sources (**Table 2**). The average annual household income[6] of an individual who filed for bankruptcy during the sample period was $25,250 from 1998 to 2006, and $26,490 from 2007 to 2009. The average annual income of an individual who filed a debt-restructuring proposal ranged from $34,000 (for 1998–2006) to $36,500 (for 2007–09). In both categories, at least 10 per cent of filers reported no household income. Average income was particularly low for individuals who filed for bankruptcy, since many of them—between 16 per cent and 19 per cent—were unemployed, whereas the percentage of unemployed among those filing for debt restructuring was close to

4 Unlike the OSB data, those calculations are at the household level, rather than at the individual level. They are based on household survey data from the *Canadian Financial Monitor* (Ipsos Reid) and are similar to the debt calculations in Moh et al. (2009), which uses the *2005 Survey of Consumer Finances* (Statistics Canada).

5 Between 2007 and 2009, 79 per cent of individuals filing for bankruptcy were renters. Among those filing for restructuring, 61 per cent were renters.

6 We define annual household income as the bankruptcy filer's monthly income, plus the monthly income of other members of the filer's household, multiplied by 12. We do not, however, have details on the type of income, employment status, etc., of other household members.

the national average of between 7 per cent and 8 per cent. These figures suggest that employment status is a key determinant of bankruptcy for individuals. This is consistent with the findings of Domowitz and Sartain (1999) and Dick and Lehnert (2010). As well, employed individuals who file for bankruptcy tend to have low-wage jobs.

Table 2: **Income of insolvent Canadians**
In Canadian dollars

Monthly employment income

	Mean	Standard deviation	10th percentile	50th percentile	90th percentile
1998–2006					
Bankruptcy	1,255.81	929.85	0	1,336.39	2,352.89
Debt restructuring	1,817.87	998.06	0	1,862.51	2,978.92
2007–09					
Bankruptcy	1,293.41	998.23	0	1,375.99	2,454.55
Debt restructuring	1,873.75	1,121.50	0	1,909.62	3,155.13

Monthly income from sources other than employment

	Mean	Standard deviation	10th percentile	50th percentile	90th percentile
1998–2006					
Bankruptcy	848.42	965.89	0	580.37	2,165.23
Debt restructuring	1,029.18	1,161.87	0	700.93	2,640.19
2007–09					
Bankruptcy	914.26	2,344.83	0	654.71	2,278.70
Debt restructuring	1,167.52	1,258.80	0	895.98	2,884.62

Note: This information is available for 24.3 per cent of filers between 1998 and 2006 and 97.9 per cent of filers between 2007 and 2009.
Source: Office of the Superintendent of Bankruptcy Canada

Number of creditors

The average number of creditors to whom individuals filing for bankruptcy in 2005 and 2006 owed money was approximately 8; between 2007 and 2009, the number rose to approximately 12 (**Table 3**). This increase can be attributed to easier access to credit and, possibly, to looser lending standards.[7]

Table 3: **Average number of creditors, by liability and insolvency type, 2005–09**

	Bankruptcy		Debt restructuring	
Liability type	2005–06	2007–09	2005–06	2007–09
Bank loans (except real property mortgages)	0.95	1.48	1.07	1.84
Credit cards				
Bank/trust company issuers	1.56	2.48	1.82	3.14
Other issuers	1.32	2.14	1.44	2.83
Finance company loans	0.82	1.16	0.89	1.49
Other (individuals, lawyers, doctors and government)	2.20	3.16	1.57	2.37
Real property mortgages	0.28	0.49	0.45	0.90
Student loans	0.13	0.22	0.12	0.20
Taxes (federal/provincial/municipal)	0.60	0.83	0.49	0.70
Total creditors	**7.86**	**11.96**	**7.85**	**13.47**

Source: Office of the Superintendent of Bankruptcy Canada

Types of debt

Table 4 shows household liabilities by insolvency type and by home-ownership status for 2007–09. For homeowners, the largest liability is mortgage debt, independent of insolvency type. While mortgage debt is the principal obligation for homeowners who file for restructuring, bank debt and credit card debt are the two most significant liabilities for renters who file restructuring proposals. For bankrupt renters, the "other" category, which includes money owed to individuals, lawyers, doctors and some level of government (such as municipalities), is the largest liability. Those who file for restructuring are more likely to owe money to a bank, since financial institutions may have more incentive and ability to collect on unsecured debt and are thus more willing to consider restructuring plans, and may even encourage individuals to take this route. In bankruptcy cases, however, "other" and "taxes" are more significant liability categories.

7 Several researchers in the United States, most notably Keys et al. (2010), find that looser lending standards played an important role in the subprime mortgage crisis.

Table 4: **Household liabilities, by insolvency type and home-ownership status, 2007–09**
As a share of the total dollar amount of defaulted loans

Liability type Bankruptcy/Renter	%	Liability type Debt restructuring/Renter	%
Other (individuals, lawyers, doctors and government)	24.71	Credit cards (bank/trust company issuers)	24.58
Credit cards (bank/trust company issuers)	18.99	Bank loans (except real property mortgages)	21.84
Bank loans (except real property mortgages)	17.26	Other (individuals, lawyers, doctors and government)	15.88
Taxes (federal/provincial/municipal)	16.59	Credit cards (other issuers)	11.21
Credit cards (other issuers)	8.19	Taxes (federal/provincial/municipal)	10.66
Finance company loans	7.92	Finance company loans	10.36
Real property mortgages	3.28	Student loans	2.99
Student loans	2.83	Real property mortgages	2.02
Payday loans	0.23	Payday loans	0.47
Liability type Bankruptcy/Owner	**%**	**Liability type Debt restructuring/Owner**	**%**
Real property mortgages	56.55	Real property mortgages	71.99
Other (individuals, lawyers, doctors and government)	13.52	Bank loans (except real property mortgages)	7.65
Bank loans (except real property mortgages)	11.26	Credit cards (bank/trust company issuers)	6.78
Credit cards (bank/trust company issuers)	6.29	Other (individuals, lawyers, doctors and government)	4.67
Finance company loans	4.52	Credit cards (other issuers)	3.62
Taxes (federal/provincial/municipal)	4.34	Finance company loans	2.93
Credit cards (other issuers)	3.10	Taxes (federal/provincial/municipal)	1.97
Student loans	0.31	Student loans	0.28
Payday loans	0.11	Payday loans	0.11

Note: This information is available for 98 per cent of filers between 2007 and 2009.
Source: Office of the Superintendent of Bankruptcy Canada

Creditors and Bankruptcy

Although it is the debtor who decides to file for bankruptcy, decisions made by both the debtor and the creditor can contribute to bankruptcy.[8] Specifically, a creditor's policy governing those to whom it lends, the terms of its loans and its practices to ensure repayment during the life of the loan can all contribute to whether or not a borrower defaults. If the creditor cannot accurately assess the riskiness of the borrower before making the loan, or if the creditor cannot ensure timely repayment during the life of the loan, then default (and, hence, bankruptcy) can occur.

Allen, Damar and Martinez-Miera (forthcoming) use the data presented in the previous sections to focus on the debtor–creditor relationship and the importance of the type of information creditors collect when they lend to individuals. Financial intermediaries use both "hard" and "soft" information when deciding to lend to clients. Hard information (information that is verifiable, such as an applicant's taxable income) is typically associated with credit scoring.[9] Soft information (defined as unverifiable information processed by a loan officer,

8 The focus of this section, like the majority of the literature on household insolvency, is on bankruptcy, since those who file for bankruptcy are the most vulnerable individuals. The decision to file for bankruptcy versus debt restructuring, however, is an extremely important one, which should not be ignored.

9 A credit score is a numerical expression of a person's creditworthiness. Financial institutions use credit scores to determine whether or not to extend a loan to an individual, how much to extend, and at what terms.

such as the officer's assessment of the applicant's character) is more difficult to measure, since it tends to be more qualitative and is typically associated with the involvement of bank branch managers in building relationships with clients in a neighbourhood. Banks with a strong neighbourhood branch presence are more likely to develop relationships with their borrowers, and thus will gather more soft information about them than banks outside that neighbourhood. Gathering soft information can be costly, however, since it requires time and effort on the part of branch staff, as well as the cost to maintain the branch. If hard information is a perfect substitute for information gathered by loan officers at a branch, then a financial institution should save on the costs of gathering this information by closing branches. However, closing branches when hard and soft information are not substitutes, but complements, can lead to deterioration in a lender's portfolio.

While the credit-scoring process is the same regardless of the bank's location, monitoring of a client's ability to repay the loan varies by neighbourhood

Given the difficulties in collecting soft information, a bank's ability to use it to improve the quality of its loans depends on the total number of loans in the bank's portfolio. A bank with more loans will have fewer resources available to gather and process (or "use") soft information. While the credit-scoring process is the same regardless of the bank's location, monitoring of a client's ability to repay the loan varies by neighbourhood. For example, a bank will rely more on credit scoring in neighbourhoods where it does not have a physical presence. While potentially more cost efficient (since expenditures for collecting soft information at branches are reduced), credit scoring may result in more defaults precisely because of the bank's inability to gather soft information. Some researchers have in fact associated the observed increase in bankruptcies in the United States with the adoption of credit-scoring techniques (Dick and Lehnert 2010; Livshits, MacGee and Tertilt 2011), since this approach led to increased lending to higher-risk borrowers. They also assert, however, that the rise in bankruptcy filings was not as large as the increase in the amount of consumer credit outstanding. They interpret these findings as evidence of the effectiveness of a business model based on credit scoring, since the expanded access to credit (by households previously excluded from credit markets) and the subsequent increase in consumption are achieved at the cost of a relatively small rise in defaults.

We test the hypothesis that, in neighbourhoods where banks make a large number of loans per branch, which we interpret as using soft information less intensively, there are more consumer bankruptcies (Allen, Damar and Martinez-Miera forthcoming).[10] If the involvement of loan officers in the branches did not add any value, one would expect an even distribution of bankruptcy rates across neighbourhoods, controlling for differences in income, employment and other variables. On average, there are approximately three bankruptcies per 1,000 residents in a neighbourhood in Canada (**Table 5**),[11] although the standard deviation within a year differs substantially and the variation across neighbourhoods is large.

10 Implicit here is the assumption that the number of employees is constant across branches. Data on employees are not available at the local level. At the provincial level, the number of loan officers per branch has remained relatively constant, while the dollar amount processed per loan officer has increased. If we had these data at the local level, we could measure the effect of the number of employees, as well as the number of branches, on consumer bankruptcies. Dick and Lehnert (2010), for example, use credit card applications processed per employee as a measure of productivity.

11 A neighbourhood is represented by the first three digits of a Canadian postal code (the forward sortation area).

Table 5: **Bankruptcy filings per 1,000 residents across different neighbourhoods, 1998–2007**

Year	Number of neighbourhoods	Mean number of bankruptcies	Standard deviation	10th percentile	50th percentile	90th percentile
1998	1,148	3.1	3.2	1.2	2.8	5.2
2001	1,211	3.2	2.8	1.3	2.9	5.2
2004	1,211	3.4	2.9	1.5	3.1	5.4
2007	1,174	3.2	2.1	1.3	2.8	5.3

Note: The slight variation in the number of neighbourhoods from year to year is due to the introduction, elimination and consolidation of forward sortation areas by Canada Post.
Source: Office of the Superintendent of Bankruptcy Canada

To test our hypothesis, we use a number of econometric techniques, the simplest of which is a linear regression of per capita bankruptcy rates in a given neighbourhood on loans per branch in that neighbourhood, across hundreds of neighbourhoods and over time. Several other neighbourhood factors, such as income levels, employment and house prices, are also included. We find that we cannot reject the hypothesis and therefore conclude that soft information is important for banks. Our results suggest, therefore, that the less banks monitor the repayment of the loans they make (or the neighbourhood in which they make them), the higher the default rates will be in that neighbourhood.

Our results suggest that the less banks monitor the repayment of the loans they make, the higher the default rates will be in [a given] neighbourhood.

Regional variation in branch presence at the local level could also be a factor in bankruptcy rates. The entry or exit of neighbourhood bank branches is a frequent occurrence in Canada. Approximately 38 per cent of branches closed between 1998 and 2007, while some neighbourhoods experienced an increase in the number of branches. In Allen, Damar and Martinez-Miera (forthcoming), we take advantage of this regional variation in bank branching by considering whether local markets affected by Toronto–Dominion Bank's acquisition of Canada Trust in 2000 resulted in a change in consumer bankruptcy rates.

Following the merger, TD Canada Trust had closed the majority of overlapping branches by 2003. TD Canada Trust's market share of loans post-merger was actually lower than the combined pre-merger shares of each institution when they were separate entities. In other words, following the merger, some consumers moved to other banks for their loans. These other banks, however, did not open many new branches. The result was an increase in the market share for the other banks, but a decrease in their ability to gather and process soft information on all of their borrowers.[12] We find that neighbourhoods affected by the merger (because the neighbourhood branch was closed) saw a greater increase in bankruptcies than those where there were no closures following the merger. We attribute a substantial portion of this rise in bankruptcies to the greater market share for other banks that did not increase the intensity of their monitoring.[13]

12 These banks could have increased the number of employees per branch, which we do not observe since data are not available. There is, however, a constraint on the number of employees a branch can employ, based on size.

13 Another possibility is that TD Canada Trust rationed credit to clients who were then unable to use credit to pay for unexpected expenses and subsequently defaulted. However, we do not see a decrease in bank credit following the merger, suggesting that, since TD Canada Trust granted less credit (hence, the lower market share), these customers were granted loans by the other banks in these neighbourhoods. Furthermore, since bank credit in these markets did not increase, the possibility that more households received loans after the merger and that a portion of them defaulted (as in Dick and Lehnert 2010) can be discounted. Instead, the same amount of credit was granted in these neighbourhoods, but the distribution of households across the different banks changed. It is this change in the market shares of different banks that can explain the higher bankruptcy rates.

These results have important implications for financial stability. In Canada, a large number of bank branches were closed at around the same time as credit-scoring methods were adopted. It therefore appears that Canadian banks switched from a branch-based lending model to one in which lending decisions are made centrally, with the help of credit scores. If, as some literature suggests (Dick and Lehnert 2010), centrally coordinated lending is a perfect substitute for branch-based lending, then the presence (or absence) of branches in a neighbourhood should have no impact on default rates. The fact that we observe a link between the scarcity of branches and a rise in bankruptcies suggests that complementing credit-scoring technologies with branch-level information increases the probability that a bank will accurately determine the likelihood of a borrower declaring bankruptcy or prevent bankruptcy before it occurs.

Complementing credit-scoring technologies with branch-level information increases the probability that a bank will accurately determine the likelihood of a borrower declaring bankruptcy or prevent bankruptcy before it occurs

Multiple bankruptcies and access to credit

An important policy debate is whether bankruptcy rules are overly stringent or not stringent enough, since the availability of credit to households that have filed for bankruptcy in the past and the terms of such credit could create vulnerabilities in the household sector. Issues include the effects of bankruptcy laws on access to credit for different types of households: (i) the average borrower, (ii) someone who has recently filed for bankruptcy or (iii) individuals who file for a second bankruptcy a number of years after their initial filing.[14] The types and terms of new credit for individuals who have recently filed for bankruptcy can help to determine whether these individuals will become insolvent again in the near future or whether the bankruptcy filing gave them a "fresh start."

One of the key issues is the length of time it takes for individuals to regain access to credit after they have filed for bankruptcy. In Canada, a judge decides whether an individual can file for bankruptcy a second, third or fourth time, etc. The OSB data show subsequent filings a number of years after an initial bankruptcy. The pattern of multiple filings is interesting, particularly the interaction between creditors and debtors. Han, Keys and Li (2011), for example, find that recently bankrupt individuals in the United States are highly likely to receive a credit card offer in the mail, although with less-favourable terms than those offered to individuals who have never filed for bankruptcy.

In our analysis of the OSB data, we find that the distribution of creditors when an individual files a second time is somewhat different than the distribution at the first filing (**Table 6**). While the government and major banks are the major creditors in both filings, there is a substantial increase in automobile financers in the second filing. This result likely indicates that some debtors' vehicles are seized during the first bankruptcy filing, requiring them to seek automobile financing once they are discharged from bankruptcy. Although most provinces exempt some vehicles from seizure, not all automobiles are covered by these exemptions. Furthermore, individuals recently discharged from bankruptcy who purchase vehicles are likely to pay much higher interest rates.[15] Ongoing research at the Bank of Canada is attempting to disentangle the effects of supply and demand on the debt portfolios of those who file for multiple bankruptcies.

14 Although our focus is on individuals who have filed for bankruptcy at least once, a number of researchers have examined the impact of bankruptcy on access to credit more generally. Using a quantitative macro model, Chatterjee et al. (2007) find, for example, that tightening bankruptcy restrictions would lead to lower interest rates and more credit, with little impact on bankruptcy rates.

15 Ezsay, Jenkins and Levin (forthcoming) find that, in the United States, the annual interest rate on a car loan for subprime borrowers ranges between 20 per cent and 30 per cent, often in line with the state limit.

Table 6: Principal creditors for individuals filing for a second bankruptcy
Percentage of dollar amount

First bankruptcy filing		Second bankruptcy filing	
Creditor	%	Creditor	%
Government	12.48	Government	22.70
Bank 1	9.47	Automobile financers	10.40
Bank 2	8.01	Bank 2	9.79
Bank 3	7.04	Bank 1	7.37
Credit union 1	5.70	Other financing	6.66
Other financing	5.67	Unknown	4.08
Bank 4	5.57	Bank 4	3.79
Automobile financers	5.43	Credit union 1	3.63

Note: "Other financing" includes all non-bank finance companies other than payday lenders. Second filings are those that take place within three years of the first filing.
Source: Office of the Superintendent of Bankruptcy Canada

Conclusion

Studying the balance sheets of individuals, as well as their income and expense statements at the time of insolvency, can provide information about the financial decisions of both debtors and creditors that could lead to potential vulnerabilities in the household and financial sectors. This article has presented some stylized facts about insolvency in Canada's household sector and has reviewed research on the creditor's role in insolvencies. The average debt of an individual filing for bankruptcy is approximately 1.6 times larger than the debt load of the average Canadian household. Moreover, bankrupt individuals tend to be unemployed, so have little to no income, and are typically renters. Unlike the debt load of the average Canadian household, the debt of a large percentage of bankrupt individuals does not include mortgage debt, but is instead composed of bank loans and credit card debt. We find that individuals who have recently filed for bankruptcy had more creditors than those who filed even a few years earlier, suggesting that there is easier access to credit than in the past. Some researchers have argued that this is due to credit-scoring methods that result in financial institutions lending to riskier borrowers.

Our main empirical finding is that banks that approve more loans per branch—which we interpret as using soft information less intensively—experience more client bankruptcies. This finding has important policy implications, because it indicates that hard information cannot fully replace the type of information gathered at local branches. Therefore, financial institutions that do not use soft information risk further deterioration in their loan portfolios.

This article does not address the growing size of the alternative financial services industry in Canada. For example, payday lenders now account for around 6 per cent of the creditors in our data. More research is needed on their role in consumer finance, since they typically provide credit to the most constrained borrowers (Stegman 2007). In the academic literature published to date, it is still an open discussion whether payday lenders direct individuals onto the path to bankruptcy or, by providing an important source of short-term liquidity, steer them away from it. Future research at the Bank of Canada will focus on this question.

Literature Cited

Allen, J., E. Damar and D. Martinez-Miera. "Consumer Insolvency and Information." Bank of Canada Working Paper (forthcoming).

Chatterjee, S., D. Corbae, M. Nakajima and J.-V. Rios-Rull. 2007. "A Quantitative Theory of Unsecured Consumer Credit with Risk of Default." *Econometrica* 75 (6): 1525–89.

Dick, A. A. and A. Lehnert. 2010. "Personal Bankruptcy and Credit Market Competition." *Journal of Finance* 65 (2): 655–86.

Domowitz, I. and R. Sartain. 1999. "Determinants of the Consumer Bankruptcy Decision." *Journal of Finance* 54 (1): 403–20.

Einav, L., M. Jenkins and J. Levin. "Contract Pricing in Consumer Credit Markets." *Econometrica* (forthcoming).

Han, S., B. J. Keys and G. Li. 2011. "Credit Supply to Personal Bankruptcy Filers: Evidence from Credit Card Mailings." Federal Reserve Board Finance and Economics Discussion Series Working Paper No. 2011-29.

Han, S. and G. Li. 2011. "Household Borrowing After Personal Bankruptcy." *Journal of Money, Credit and Banking* 43 (2–3): 491–517.

Keys, B. J., T. Mukherjee, A. Seru and V. Vig. 2010. "Did Securitization Lead to Lax Screening? Evidence from Subprime Loans." *Quarterly Journal of Economics* 125 (1): 307–62.

Li, W., M. J. White and N. Zhu. 2011. "Did Bankruptcy Reform Cause Mortgage Defaults to Rise?" *American Economic Journal: Economic Policy* 3 (4): 123–47.

Livshits, I., J. MacGee and M. Tertilt. 2007. "Consumer Bankruptcy: A Fresh Start." *American Economic Review* 97 (1): 402–18.

———. 2011. "Costly Contracts and Consumer Credit." NBER Working Paper No. 17448.

Meh, C. A., Y. Terajima, D. X. Chen and T. Carter. 2009. "Household Debt, Assets, and Income in Canada: A Microdata Study." Bank of Canada Discussion Paper No. 2009-7.

Sarra, J. 2008. "Economic Rehabilitation: Understanding the Growth in Consumer Proposals." Insolvency Research Initiative, Office of the Superintendent of Bankruptcy Canada. Available at <http://www.ic.gc.ca/eic/site/bsf-osb.nsf/vwapj/Economic_Rehabilition.pdf/$file/Economic_Rehabilition.pdf>.

Stegman, M. A. 2007. "Payday Lending." *Journal of Economic Perspectives* 21 (1): 169–90.